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Do adjustments on account of those failures cost money?

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Quality Control of Reclaimed Rubber

*Methods for Controlling Reclaim Manufacture—
Scrap Selection, Specific Gravity—Rubber Content—Tensile
Properties and Working Quality*

WEBSTER NORRIS

RECLAIMED rubber is classified according to the type of scrap from which it is derived, as tire, tube, shoe, or mechanical blend reclaim. While there are no standards governing rubber quality, competition compels close conformity in the essentials of quality and value of reclaims derived from the same type-scrap sources.

Systematic scrap selection and blending serve as the basic reliance of the reclaimer in standardizing his product for gravity. The reclaims derived from the type-scrap selections mentioned can be standardized further by modifications of the reclaiming method and the subsequent processing details of washing, drying, pigmenting, milling, refining, straining, etc.

Rubber Scrap

The important type-scrap rubber sources comprise pneumatic tires, floating, red and compounded inner tubes, boots and shoes, solid tires, miscellaneous mechanicals and molded rubber articles. The miscellaneous group includes every variety of mechanical rubber goods and molded rubber articles. Although it is a low grade source, it yields about 8.5 per cent of the reclaim output of a quality suited to compounding non-specification and cheap goods. Pneumatic tires account for four-fifths of the reclaim manufactured, as indicated in table of current relative production published herewith.

The fact that reclaims are derived from discarded vulcan-

Relative Proportions of Reclaim Grades in Current Production

Type of Reclaim	Per Cent
Tire	80.0
Tube	8.5
Shoe	3.0
Mechanical Blend	8.5
	100.0

Figured from R. M. A. statistics, August, 1928—July, 1929.

ized rubber scrap might seem to preclude the possibility of dependable qualities; yet every reclaimer produces remarkably uniform products; also the same type grades by different reclaimers are comparable in quality. The sufficient reason for this lies in the fact that competitive quality compounds have been developed for each type of rubber product so that reclaims derived from such goods are characterized, although in lower degree, by the average type quality of the source materials.

The principal factors in the regulation of the ultimate quality of a reclaim are scrap selec-

tion, averaging by blending, washing, reclaiming, pigmenting, milling, straining, and refining. These processes together serve to standardize or equalize reclaim qualities on the essential points of (1) specific gravity, (2) rubber content and analysis, (3) tensile properties, and (4) working quality.

Specific Gravity

Specific gravity is not a criterion of quality for either reclaim or crude rubber. Its chief significance lies in its bearing on volume cost of the product as distinguished from pound cost. Thus, as an economic factor, gravity merits close regulation. In the main the specific gravity of reclaim depends on the average scrap contents of the reclaiming batch. This may consist of one type of scrap or a mixture of several types proportioned to produce a reclaim of desired gravity and quality.

PHYSICAL AND CHEMICAL PROPERTIES OF TYPE RECLAIMS

This table illustrates the range in physical and chemical properties of type reclaims obtained from the principal scrap sources. The gravities, analyses, and physical properties are the minimum and maximum values over long periods as reported by seven leading manufacturers of reclaim in the United States. In other words, any minimum value appearing below represents the lowest of all the figures reported by the seven manufacturers for the particular type reclaim; and similarly any maximum represents the highest of all the figures so reported. While the wide spread between these minimum and maximum values is the result of actual data reported, this spread is not to be taken as in any way applying to the properties of a given type of reclaim made by a given manufacturer.

Reclaims	Specific Gravity	Rubber Content %	% Ash	% Acetone Extract	Tensile at Break Lbs. Per Sq. In.	% Elong. at Break
Floating inner tube.....	0.95—1.00	75.0—90.0	3.0—7.0	4.0—10.5	100—1000	300—700
Semi-floating inner tube.....	1.05—1.10	65.0—80.0	3.0—19.0	4.0—13.5	450—1000	350—650
Compounded inner tube.....	1.11—1.55	50.0—70.0	15.0—45.0	3.0—14.0	200—1700	300—650
Selected whole tire.....	1.18—1.27	45.0—64.0	20.0—29.0	8.0—15.0	300—1000	300—500
Tire carcass.....	1.00—1.20	65.0—84.0	5.5—20.0	7.0—10.0	300—750	300—450
Solid tire.....	1.35—1.70	30.0—47.0	17.5—50.0	8.0—15.0	450—1050	250—425
Boat and shoe.....	1.52—1.75	30.0—40.0	43.0—55.0	6.0—12.0	350—800	150—300
Hose.....	1.32—1.50	35.0—54.0	34.0—45.0	8.5—14.0	350—650	300—400
Air bag.....	1.25—1.65	30.0—51.0	26.0—50.0	10.0—20.0	350—850	300—450

From The R. T. Vanderbilt Note Book.

Selection and proportioning of rubber scrap is therefore the basic factor controlling uniformity of composition of the reclaim product. Selecting and proportioning the batch make-up is virtually large scale compounding. It has its analogy in blast furnace and foundry cupola practice where the materials charged are selected on the basis of their analysis and the mixing is proportioned to produce a product of desired quality.

Final adjustment of gravity, and color as well, is possible and allowable, within narrow limits, by incidental pigmentation that will not substantially influence the essential physical properties of the product while favorably affecting its working quality.

Rubber Content and Analysis

Since tire and tube reclaims together comprise 88.5 per cent of all that is produced, the respective rubber content and analysis of these sorts are very important. The intensive study by chemists and compounders, concentrated for years in perfecting tire and tube stocks, has developed a generally accepted scheme of rubber compounding practice resulting in approximate uniformity of rubber content, analysis, and tensile properties in each of these lines. The results of this work have simplified for the reclaimer the maintenance of high rubber content and help correspondingly in the matter of analytical control and tensile properties.

Tensile Properties

Tensile properties inherent in rubber scrap are preserved to greater or lesser degree by the reclaiming processes including the addition of auxiliary materials before and after devulcanization. These promote plasticity, dispersion, and curing quality. Pigmentation for these purposes is legitimate since its purpose and effect is to improve and standardize the product and not for its reduction to a price level by addition of cheap mineral diluents.

Working Quality

The term working quality signifies those physical characteristics of a reclaim that make its use in compounding not only convenient, desirable, and economically successful but helpful from the point of view of facilitating the various machining requirements of the stock in the manufacture of goods. The working quality and technical value of reclaim is acknowledged to make it second only to crude rubber for compounding purposes. In fact in the manufacture of most lines of rubber goods it proves indispensable and technically is preferable to crude in special cases, quite apart from price considerations.

Working quality sums up the effect of the standardizing procedures previously mentioned, supplemented by the cleaning processes of magnetic separation of iron, straining for removal of particles of wood, non-magnetic metals, and washing to eliminate sand and grit. The final operation is mill or calender refining for the development of uniformity of plasticity.

"Chondrilla" Rubber Plant Grows Wild in Russia¹

The constantly developing rubber industry in Soviet Russia has involved increasing expenditures for raw materials. Two remedies have been suggested: manufacturing synthetic rubber and cultivating rubber-bearing plants in Russia. The Rezinotrest (the Russian rubber trust) has experimented with guayule shrubs in southern regions of the Soviet Union, but without success. Attempts have been made also to find a rubber-producing plant.

Unexpectedly, this search has uncovered a wild plant whose roots secrete a juice which, when mixed with earth, forms a slime, capable of producing a material analogous to rubber. It was discovered in Azerbaijan and Kazakstan. It is of the genus *Chondrilla*, that has a larval parasite, which, in the course of feeding, produces a substance out of which the cocoons are made. These cocoons have long been known to the local population and are used as chewing gum. But it is believed that they consist of rubber.

In Kazakstan, in the sands of Barkhan, other varieties of *Chondrilla* are found, which also secrete a sort of rubber, used for chewing gum. This has been examined by the Supreme Council of National Economy and the Rezinotrest chemists, who state the gum is rubber.

The Kazakstan *Chondrilla* grows larger than the other species and gives more gum. A sample of 20 or 30 tons treated at the Krasny Bogatyr rubber plant produced a good quality rubber and a series of gums of great industrial interest, possibly more valuable for certain purposes than rubber itself. Experiments so far indicate that *Chondrilla* can replace rubber in certain articles and can be mixed with rubber for other fabrications.

The plant is found in sandy regions from Astrakhan to China. A harvest of 26,000 tons of juice is expected to be obtained easily. *Chondrilla* can be readily cultivated on an industrial basis. It is hoped to utilize this plant to reduce importations of rubber and to give work to inhabitants of the least productive regions of Central Asia.

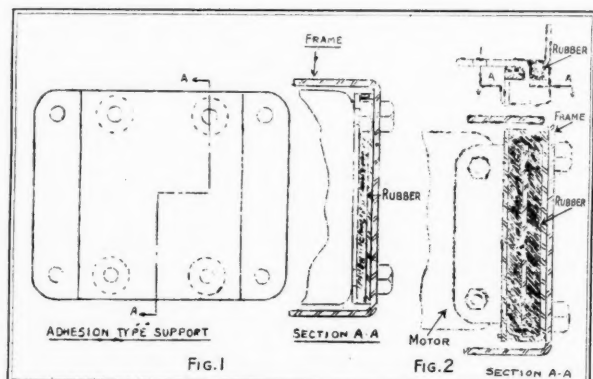
¹ From *La Vie Economique des Soviets*, Oct. 5, 1929.

Conquest of the Air

In which a Leading Part is taken by Rubber

Rubber in Airplane Construction

C. SAURER¹



RUBBER, at the present time, regardless of its form, shape, or size, is universally thought of in terms of devices for absorbing shocks and energy. This mental association is made because it has become well known from experience that the major physical characteristic of rubber is its ability to receive shocks and vibrations, of varying intensities, without passing them on to contacting objects—or in other words, its ability to dissipate energy. It is not claimed that rubber insulation, even when used to its best advantage, will dampen out all vibratory and shock movements, but rather that it is a most ideal substance for the absolute cushioning of these movements.

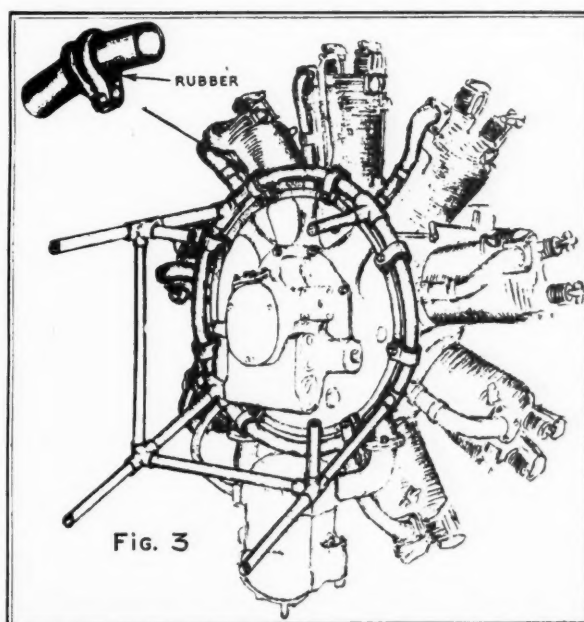
Rubber, in its various compounded forms, has other remarkable and interesting characteristics such as its ability, when acted upon by force, to change its form, either in the direction of compression or elongation, returning practically to its original form when the force is removed. Also its peculiar characteristic of almost equally resisting movement in all directions makes it fit in ideally in shock insulation work. Tensile strength as high as 5,000 pounds per square inch, permanent set in the direction of compression, as low as 7 per cent, hysteresis control, and variations in hardness ranging from soft putty-like consistency to horny hard rubber are all commercial possibilities available to present-day designers. However, regardless of what may be the other characteristics of rubber, it is its ability to dampen out shocks and vibrations that should interest the airplane designer most.

Vibrations are necessarily attendant to motor action, and it is the designer's and the builder's job to reduce these vibrations to a minimum before being passed on to the fuselage and occupants of the plane. This is necessary not only to preserve the plane itself, but also to add to the comfort and safety of air transportation. For proof that rubber

is and has been doing a wonderfully successful job in this capacity, we only have to refer to what has been accomplished in the automotive industry. The comparatively recent development wherein an effective bond can be secured between soft rubber and steel has put into the hands of the automobile designer one of the most potent tools for construction and performance improvements in recent years. Torque insulators, smoothing out shocks in the transmission shafts, clutch rubber assemblies, toning out jerks caused by sudden action of clutch engagements, rubber spring shackles, and engine motor mountings eliminating four-fifths of motor vibrations, are all materially adding to the remarkable smoothness of automobile operation. We normally think of an automobile as a steel fabricated vehicle, and yet a well-known manufacturer recently announced that his car contained over four hundred separate rubber parts. This in itself is conclusive proof that rubber is doing an excellent job in the automotive field.

The particular underlying principles promoting these remarkable improvements in the automotive field are in the same way even more applicable to the airplane industry. In fact, it is largely due to the entirely satisfactory performance of rubber in automobiles that has prompted rubber manufacturers to lay out development programs for the extensive use of rubber in airplanes.

After all is said and done, of the four hundred or more



¹ Development Department, Firestone Tire & Rubber Co., Akron, O. Paper read at the aeronautics meeting of the American Society of Mechanical Engineers held in Akron, O., Oct. 22, 1929.

rubber parts used on an automobile, the most important, aside from tires, are the rubber motor supports. They have done more for the absorption of vibration and the elimination of noise than any other device.

In the airplane they are of even greater importance, as they retard and prevent crystallization of otherwise affected metal structure, thus prolonging its life. Much thought has been given to the design of airplane motor supports, the requirements being very different from that of an automobile.

In an automobile motor the reciprocating action of the engine pistons sets up a series of vibrations which are all primarily of a vertical nature.

Of the many forms of rubber insulators the most successful ones have applied the principle of vertical vibration elimination, depending upon an efficient bond of rubber between steel parts. Figures 1 and 2 show two such installations. Any desired degree of cushion in the vertical plane is obtainable without the ill effects of a substantial engine movement.

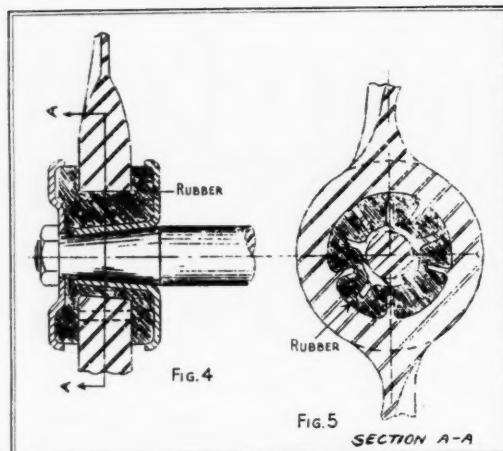
These motor supports are directly applicable to airplane motors of the "in line" type. It is recommended that the support shown in Figure 2 be used, because of its greater factor of safety.

With the radial type motor the problems become quite different. We have to contend with three major sets of vibrations. First, we have radially disposed vibrations in a vertical plane set up by the motor. Second, we have propeller vibrations, mostly running in opposite rotation to the motor vibration, but in the same vertical plane. Third, we have vibrations from the propeller thrust; these are at right angle to the vertical plane vibrations and are radially disposed. Besides these three major vibrations many other factors, such as gravity, torque reaction, gyroscopic action, etc., have to be considered.

The best solution for these varied problems of vibration elimination on radial type motors is to have radially installed motor supports, as shown in Figure 3. These motor supports are not intended to absorb all vibration, but they do absorb and reduce periodic vibration and check a large part of the greater shocks. Safety, light weight, suitability for torque reaction, and gyroscopic action were deciding factors in the adoption of this design. It is hardly possible to insulate the motor from the rest of the airplane in such a way that no vibrations are transmitted. To absorb completely all the vibrations, an amount of material would be necessary which would increase the weight of the plane to such a degree to make it impractical from a weight and cost standpoint.

Rubber in Airplane Shock Absorbers

The shock to be absorbed by an airplane shock absorber should be not less than four times the static weight of the plane. To dissipate the shock of the landing impact, the travel of the shock absorber should range over a long enough period of time to bring this weight slowly to rest. This has been accomplished by air, hydraulic, steel spring or rubber devices, or combinations of these. The light weight and strength of rubber have made the compression disk and tension cord shock absorbers so popular with the airplane designer. The comparatively low cost and easy maintenance of such an installation have been added reasons for their use. The tension cord shock absorber is undoubtedly the



cheapest and lightest device to bring the falling weight of the plane to rest. A steel spring, designed to absorb the same energy and weight in the same length of travel would be approximately seventy-five times heavier than the shock cords. According to the designer's views the shock cords are used in various ways: they are laced between spokes and cross each other; they may be used straight and wound parallel. The differences in spacings and windings are many. The shock cords have a maximum elongation of ten to eleven times the original length; in use they seldom exceed one-half of the total

elongation possible. A cable of 1/2-inch diameter carries approximately 220 pounds for every inch of elongation. Tests made with tension cord shock absorbers show that approximately 14 per cent of energy is absorbed by them, the variety in designs or spacings having very little effect on this.

The compression disk shock absorbers vary somewhat from the tension cord shock absorber, insofar as total travel is concerned, the travel being considerably less under impact than on the tension cords. As the load increases on the rubber disks, the travel reduces rapidly. Therefore, special care has to be taken in the design, to prevent the shock of the impact from being transmitted to the fuselage.

The energy absorbed in the compression disk device is approximately 17 per cent.

The performance of rubber shock absorbers can be improved by rebound checks, preventing the plane frame bouncing.

Other uses of rubber in airplane construction are leak-proof tanks. These are especially valuable in military airplanes. The construction of this tank lining is very similar to puncture-proof inner tubes. Several layers of rubber are put together in such a fashion that they are in compression and will seal holes of small size automatically. These leak-proof gasoline tanks are also some insurance against airplane crashes.

The time for general adaptation in airplane designs for air-filled rubber seat cushions should not be very distant. The light weight and wonderful comfort derived from such a seating arrangement coupled with the life-saver qualities for seaplanes, will certainly open a field both for the airplane designer and rubber manufacturer.

Another article which is now being developed in cabin planes is a rubber lining which will insulate the passengers from outside noises and changes in temperature. Experiments and developments are conducted to reduce the weight and cost of such linings to make them practical for installation on planes.

A propeller insulator would also greatly help in the reduction of vibration. This would be a device similar to an automobile's torque joint and would be interposed between the motor drive shaft and the propeller hub as shown in Figures 4 and 5. The long-desired rubber fender for automobiles might become a reality on airplanes as streamline housing for wheels.

Aside from insulation of gasoline lines, cables, grommets, handle bars, and so on, where rubber is used on airplanes, there are many other points where it might be used, be it in solid or movable joints, in insulation of vibration, or any other problems where steel is subject to crystallization from changeable stresses.

Rubber Cements¹

S. D. Sutton, F.C.S., A.I.R.T. (Tech.)

Tire Repair Cements

THE manufacture of tire repair cements is largely in the hands of tire manufacturers, but a few concerns market tire repair kits of special types and some firms sell the repair cements in conjunction with tire repair vulcanizers.

The familiar tube or tin of rubber cement sold at garages for use with patches usually contains 10 to 12 per cent of Para or smoked sheet rubber masticated in gasoline or benzene. Smoked sheet in benzene is to be preferred, and the adhesiveness can be greatly enhanced by the addition of 1 or 2 per cent of rosin or similar gum.

Sticky patches are sometimes coated with cement which has been specially prepared to prevent drying out when kept in stock. Resinous wild rubbers are extremely useful for the purpose and can be added to Para or smoked sheet during the mastication process. Another method is to subject smoked sheet to open steam for several hours and then masticate well; the result will be a very tacky rubber which can be cut with gasoline for spreading or calendering on to the patch rubber.

Many makers of repair kits advertise self-vulcanizing patches, and these embrace either the sulphur chloride or organic accelerator method to effect vulcanization, the vulcanizing agent being contained either in the solution or the patch. Vulcanization by sulphur chloride is also used in the preparation of tire filling compounds.

The repair of tubes and casings by "hot" vulcanizing calls for special types of cement designed to cure in the same time as the unvulcanized repair compound. Most of these cements are slightly compounded and contain sulphur and suitable organic accelerators. Certain firms incorporate the cement or flux with the repair compound forming a dough which, after roughening the surface to be repaired, can be pressed into the puncture or injury and vulcanized by heat, thus saving the cementing operation.

Cements used in the retreading of tires are often made up by cutting some of the tread stock with gasoline, but this method is not recommended as the high percentage of gas black used in tread mixings leaves a very dry deposit, and the adhesion of the plys is liable to be very poor.

Boot and Shoe Cements

The introduction of the crepe rubber sole and more recently the new rubber soling compositions has led to a greatly increased consumption of rubber cements in the boot and shoe industry.

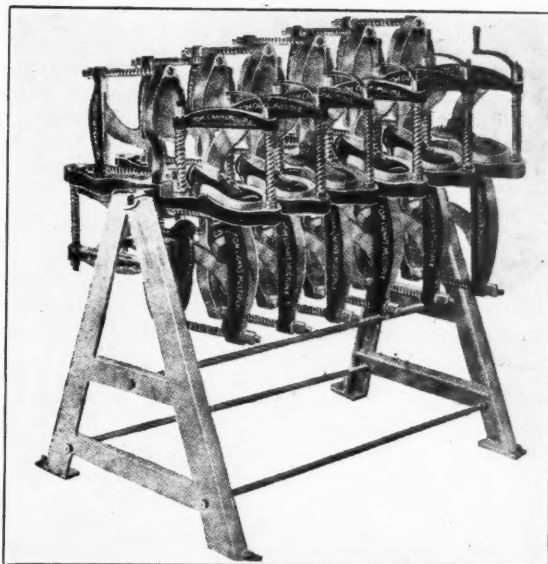


Fig. 1—Multiple Press Used in Making Cemented Shoes. Fitted with Rubber Pressure Pads

Para solution has been used for many years by a few shoe manufacturers for certain operations, but it was not until the advent of scientifically prepared cements that their full advantage was obtained in the production of leather shoes without nails or stitches. Manufacturers and repairers are now able to make use of equipment and cements designed specially for this process. The presses are made in various sizes and can be used by either manufacturer or repairer.

There are two methods of cementing: The process shown in Figure 1 uses a rubber pressure pad constructed in such a manner that when pressure is applied, air is automatically compressed in small chambers underneath the pad. The second method is shown in Figure 2. When the shoe is in the press, it rests on a leather cover over a receptacle filled with water. When the pressure is applied, the sole is compressed into the leather cover, thus displacing the liquid which molds the leather cover perfectly into the shape of the sole. The liquid offers resistance, and the pressure is distributed equally over the sole excluding all traces of air pockets.

Latex Cement

A self-vulcanizing cement should be used in conjunction with rubber latex to obtain the best results. After buffing the surfaces, the leather is given a coat of latex and, when dry, a coat of self-vulcanizing cement. Latex alone does not give a tacky surface; but its penetrative and adhesive properties with leather have been found superior to rubber cement, and the combination of the two has given almost perfect results.

The cement should be of the quick curing type containing rosin or resinous rubbers to enhance the adhesive properties. As sulphur must be added to the cement, only sufficient should be mixed for immediate needs. After the joint has been made, the vulcanizing agents migrate from the cement and vulcanize the thin latex film on either side. The soles of boots and shoes attached by this process are unaffected by changes in temperatures, and the joints are permanent. It has been found that in order to obtain the maximum results when using latex for joining leather to leather, a dry rubber content of not less than 33 per cent is essential. For certain purposes where the leather is only held in place while being stitched, a lower rubber content latex can be used.

A new type of cement incorporating a solvent with latex

¹ Continued from INDIA RUBBER WORLD, Dec. 1, 1929, pp. 58-59.

has recently been placed on the market and, while the rubber content is low, it is claimed that the action of the solvent increases the adhesiveness by attacking and swelling the rubber particles. Large quantities of this cement are being used for a variety of purposes but mainly in the shoe industry.

Concentrated latex is also used and can be mixed with cork to make fillings for boots and shoes.

Cementing Rubber Soles to Leather

Many methods of attaching crepe soles to leather were tried before a satisfactory permanent joint was obtained. Either sulphur chloride or accelerated vulcanizing cements give good adhesion, but there is nearly always a tendency for the sole to lift at the toes owing to the spreading of the unvulcanized crepe. This difficulty may be overcome to a great extent by first stitching a thin layer of crepe to the leather and then cementing on the crepe sole.

The new rubber soling compositions have found great favor with the public because of their excellent wearing properties. When these were first introduced, they were either stitched or riveted in the usual way by manufacturers or repairers. It was found, however, that in actual use the new material could not be treated exactly like leather, as hammering caused the rivets to lift, and after the sole had been worn some time, the stitches would "give" slightly, causing the sole to lift in the center. This made walking uncomfortable and might have affected the popularity of the new sole, but these defects have now been eliminated by cementing the sole to the leather before riveting or stitching. A quick curing cement is best for this purpose, advantage being taken of the sulphur in the rubber sole to complete vulcanization.

Certain manufacturers prepare the surface of their rubber composition by coating with adhesive similar to a sticky patch. This enables very neat cemented repairs to be carried out with the minimum of labor and expense.

Repair Cements

Each winter brings an increasing demand for Wellington gum boot repairs, and special cements and compounds are needed to effect repairs capable of giving satisfactory service. The cement used must be quick curing and dark in color, having the minimum of zinc oxide as this tends to leave a white line at the joints, giving a bad finish to a repaired black gum boot.

The "stick on" sole is losing its favor owing to the new soling compositions, but large quantities are still used and are best attached with cement similar to that described for these soling compositions.

Rubber Flooring Cements

Like rubber roadways the laying of rubber flooring is by no means an easy task. This is due to the many types of base in use, although wood and concrete are most common. Casein-lime cements, when set hard, give excellent results on wood, but the rubber flooring has to be kept in contact with the base by weights until the cement is dry, making the process lengthy. Although rubber cements give good results with practically any base, the fumes of the solvents used are the cause of much complaint from the work people laying the flooring.

A self-vulcanizing cement using benzol as a solvent gives the most efficient results, but as the fumes are very poisonous, large scale work is out of the question. The non-flam solvents are also difficult to use owing to their toxic properties. A new non-flam solvent, methylene chloride, offers possibilities as it is very volatile and not so poisonous as the other chlorinated solvents. At present, however, the high cost makes its commercial application as a rubber solvent limited.

Certain grades of gasoline are, therefore, chiefly used for flooring cements which have their compensations, even if they are not so efficient as those mentioned above.

Cements made from concentrated solutions of shellac and resin in alcohol are used by certain rubber flooring manufacturers with a fair amount of success, but a good self-vulcanizing rubber cement, utilizing the sulphur in the flooring to effect vulcanization, has the advantage over the non-rubber types inasmuch as it retains its resilience and does not tend to become brittle in the course of time.

Garment Solutions

The waterproof garment industry uses a considerable quantity of rubber cement, which generally consists of pure Para in gasoline. Smoked sheet or crepe can be used with almost equal results but as a "lifeless" rubber deposit is essential, prolonged mastication is necessary. Unvulcanized cements containing no rosin, etc., are used as the seams of garments have sometimes to be lifted; in addition surplus cement on the facings is easily removed.

Millinery cement is usually made from blanket crepe in a non-flam solvent. The rubber should be slightly masticated to give added strength, but with these exceptions the foregoing remarks in connection with garment solutions apply.

Tennis Ball Cements

The success of the stitchless tennis ball is due in no small measure to self-vulcanizing cements which enabled the segments of the melton cover to be attached, giving a durable waterproof joint. A cement using an ultra-accelerator capable of vulcanizing within twenty-four hours should be used for coating the ball, and a cement vulcanizing within twelve hours for the edges of the segments. Provided the segments are properly joined and sufficient time allowed to complete vulcanization, no spewing of the cement will occur when the ball is ironed.

Miscellaneous Solutions

Many other industries use rubber cements, but the majority use cements which fall within the various types already described.

Although blanket crepe has been mentioned many times as being more suitable than the thin pale crepe, it is possible to adjust conditions of preparation of the latter to give almost as good results. Slightly less mastication will give increased strength, while a small increase in the quantity of accelerator improves the vulcanizing time.

The addition of certain colloids to rubber latex such as glue casein, dextrine, etc., improves the adhesive qualities of rubber for certain purposes and by using vulcanized latex the maximum strength is obtained. These col-

(Continued on page 64)

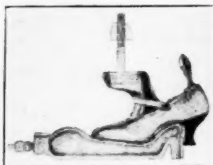


Fig. 3—Shoe Under Full Pressure

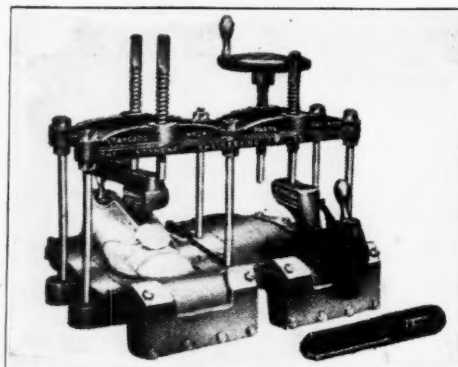


Fig. 2—Press Used by Repairers of Cemented Shoes. Fitted with Water Pressure Bed

Manufacture of Tire Treads

JOSEPH ROSSMAN

A Survey of United States Patents Relating to the Machinery and Processes Utilized in the Production of Treads for Pneumatic Tires

THE tread of the pneumatic tire is one of its most important components. It protects the casing and provides a surface which must withstand a great deal of wear and tear during the life of the tire. Tire manufacturers have therefore made many efforts to improve the tread which is so vital to the tire. The tread is made up from various layers of rubber or layers of rubber and fabric. In early methods the strips of rubber were cut in different widths; then cut to proper length and built up by hand, one layer upon another until the proper thickness was obtained. This was expensive and difficult because air bubbles formed between the strips.

This method was superseded by an automatic device as described in U. S. Patent No. 981,981, January 17, 1911, to Crook. Strips of rubber are wound on a drum having a stepped groove in its face, the steps corresponding in width to the several strips to be wound. As the strips are wound in the drum, they are tightly pressed by spring pressed rollers into a composite tread, stepped on opposite sides to give a rounded surface to the completed strip.

Using a Single Sheet of Rubber

IN CROOK'S machine separate rubber strips were employed, each strip being wound on rolls as it came from the calender with an interposed liner. This method required a number of separate rolls and a great deal of lining material, which made the process complicated and expensive. The next improvement consisted in using a single sheet of rubber cut into strips and wound in a liner. This process is disclosed in U. S. Patent No. 1,206,530, November 28, 1916, to Gordon.

Referring to Figure 1 of the group illustration, it will be noted that the strips vary in width, the widest being at the left. This strip passes down over a roller and rests upon the upper surface of the aprons. The second strip is superimposed upon the first, and the roller beneath will crowd in on the first strip, the guide-plates directing it in the proper direction. The guides, being centrally pivoted at their lower end, are fixed at that point; while their upper ends are free to yield slightly as may be necessary to accommodate themselves to the direction of the movement of the rubber strips over them. The natural tendency, therefore,

is gradually to work the strips into their predetermined position with relation to the finished product. The third strip is superimposed upon the surface of the second strip and caused to adhere thereto by pressure rolls, and so on until the strip is completed as it passes beneath the last bearing roll.

Building Tread Directly from Calender

A LATER development consisted in entirely eliminating the use of a liner. In U. S. Patent No. 1,363,441, December 28, 1920, to Steele, the sheet of rubber is cut into strips as it passes around the calender roll. The strips are then immediately superposed in an endless belt to form a tread.

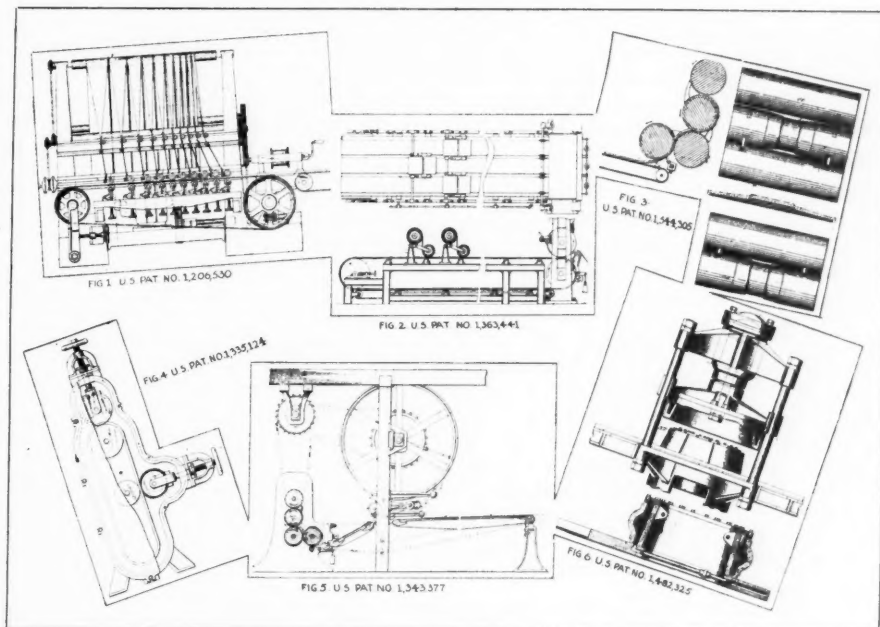
The apparatus, which is shown in Figure 2, consists of three calender rolls mounted in side frames and a series of cutting knives adjustably mounted on a bar attached to the side frames. In use, the two top rolls of the calender are set the required distance apart, and the lower roll spaced a distance from the middle roll that is greater than the thickness of the belt and the finally built up plies of material on the belt, as will be later understood.

A belt encircling the lower calender roll and also encircling an idler roll is adapted to receive from the calender the various plies of material after the sheet has been cut longitudinally by the knives.

It will be seen that after laying down on the belt one strip of the length of the belt, other plies can be laid down on the first ply until the stock is built up to the desired thickness. It is then cut transversely, and one end, together with an end of the lining, is wound on the stock roll.

Continuously Forming Tire Treads

IN THE manufacture of pneumatic casings, tread rubber is first calendered into a sheet of uniform thickness and then into a strip of a cross-section more or less trapeziform. This is accomplished by passing the rubber between



a pair of parallel rolls which form it into a sheet that is carried around to the bight of a second pair of cooperating rolls, one of which is engraved to produce the cross-section desired in the tread stock. The sheet of uniform thickness made in the first pass is wider and thinner than the finished tread stock, and consequently at the final pass the rubber is compelled to flow from its opposite sides towards the center. This flow is at right angles to the application of pressure by the calender rolls and frequently results in an imperfect product. These imperfections occur especially on starting a calender, necessitating a lengthy run before the tread stocks are of uniform cross-section and density to pass requirements.

According to U. S. Patent No. 1,544,305, June 30, 1925, to Fisher, tread stocks may be produced more uniform in cross-section and density by forming them in successive stages. The composition is first brought roughly to the cross-section desired and subsequently compressed to bring it to the final desired cross-section.

Referring to Figure 3, the first three rolls of the calender are stacked vertically, the fourth roll being arranged horizontally to one side of the bottom roll for convenience in changing over to make a tread stock of a different size or shape. But the relative location or disposition of the rolls is widely variable. The second and fourth rolls are preferably engraved, and guides are employed to control the width of the plastic strip. Cooperating with the fourth roll is a knife which trims the stock and renders the strip uniform in width. The tread stock is delivered by a conveyor to a cutting station for severance at the approximate length to encircle a plied up carcass.

The essential principle of the invention is to make a strip slightly thicker than desired, afterwards compressing the strip to reduce its thickness and compel the rubber to flow in opposite directions from the center towards the sides of the strip. In this way, fissures, scales, or like imperfections are eliminated.

Removing Air from the Laminated Layers

DURING the preparation of crude rubber and in forming it into shape much air becomes entrapped. This gives a spongy rubber that is greatly reduced in strength. Also, when heated during vulcanization, the air expands, producing bubbles which frequently break through the surface of the rubber.

According to U. S. Patent No. 1,335,124, March 30, 1920, to Midgley, and shown in Figure 4, the strip is perforated with a plurality of holes, giving the pocketed air access to the surface of the rubber, and the perforated tread is subjected to a vacuum, thereby drawing the air from the pockets. The tread is then subjected, while still located in a vacuum, to a compression which will close the pores of the rubber, preventing the return of air to within the body of the tread when the vacuum is broken, and compacting the rubber itself more firmly together.

Cooling the Tread

TREADS, however formed, are cut to approximately the size required, enough being allowed to accommodate the shrinkage which occurs during cooling and aging. The general practice is to stack the treads in books or liners for a period of one to two days during which time the rubber assumes its normal condition. It is impossible to cut a tread of the exact length under the old conditions as the shrinkage is variable and cannot be determined beforehand. It is necessary to have on hand a large amount of tread stock which occupies valuable floor space and requires a large amount of liner fabric and books. The waste stock cut from treads when they are prepared for tire manufac-

ture becomes a considerable item, and conserving of this waste would amount to a large saving.

Tread stock cooled in the way described varies in shrinkage as much as twenty-five points between the ends and the center of the lengths thus booked, a point being one-thousandth of an inch. A tread made from such stock would obviously be of a varying gage, and it is probable that many of the defects in tires can be attributed to this lack of uniformity of the treads.

Several patents have been issued for cooling treads directly after being made, whereby the shrinkage takes place at once and the tread strip may be cut to exactly the length required. Thus the floor space and equipment necessary for storage of the aging treads is saved and the scrap rubber is greatly reduced.

In U. S. Patent No. 1,343,377, June 15, 1920, to Shea, the rubber is subjected to a comparatively sudden change in temperature after it has been given formation and before it has been booked or otherwise stored. The stock is cooled by bringing the heated plastic into contact with a metallic surface which is subjected to the cooling action of water.

In operation, the rubber compound is previously warmed and placed between the uppermost pair of rolls of the calender shown in Figure 5, where it forms a bank. This stock passes between the rolls in succession and emerges from between the last pair in the form desired. The rolls are grooved to give the required cross-sectional conformation to the rubber strip for use as tire treads. From the calender rolls the stock passes on an endless apron to cooling drum around which it passes the required number of times and is then delivered to an endless apron.

Extruding Rubber Treads

RUBBER treads can be extruded as described in U. S. Patent No. 1,248,962, December 4, 1917, to Webber. A special die is used which permits the expeditious formation of a tube, the bore of which is disposed eccentrically with relation to its outer periphery and slits the tube to form a strip, the thickness of which varies from one edge to the other. It is highly essential that the strip formed by the tubing die be of uniform thickness throughout its length, but due to its inherent plasticity and elasticity, the strip tends to spring outwardly after leaving the confines of the die.

The tube forced from the die is automatically tested at intervals for uniformity of cross-section, together with an adjustable tubing die arranged to permit variations in the cross-sectional area of the tube produced so that adjustments may be made to correct inequalities in the tube as detected by the means.

Molding Tread Bands

U. S. PATENT No. 1,482,325, January 29, 1924, to Shively, provides a mold in which tread bands having non-skid tread portions may be partly or semi-cured and shaped from a single band into their ultimate cross-sectional contour with their inner face portions exactly conforming to the transverse curve of the carcass upon which they are to be applied, thereby eliminating air pockets between the band and the carcass, and obviating the detrimental distortion of the article during its application to the carcass.

Figure 6 represents an hydraulic press adapted to operate with the mold device shown beneath the press.

The mold embodies an annular drum formed with an inner wall and an outer wall vertically disposed and spaced from each other to form there-between a chamber which is closed by an annular ring. A system of piping connects the chamber with a source of heat supply such as steam or hot water.

(Continued on page 70)

How Rubber Helps "Talkies"

*Producers of Sound-Motion Pictures Depend Much on Rubber Devices to Dampen Unwanted Noises in Shooting Scenes
—Balloons Warn Airplanes to Detour*

THE bane of the sound-motion picture producer is undesired noises, or even agreeable sounds not on the program. To suppress or eliminate them is the job of the acoustical engineer, and often the tasks allotted to him tax his ingenuity to the utmost. In the filming of outdoor scenes one of the "nuisances" that gave much trouble was the noise made by passing airplanes. Microphones pick up the noise made by the exhaust from the motor and the whirling propeller blades, even though quite distant, and magnify it to such a degree that it may register louder than the wanted sounds and thus mar a sound picture.

Airplane noise has, however, been much modified and in some cases eliminated lately with a preventive device, the essential feature of which is a large captive rubber balloon. Sent aloft where an outdoor scene is being shot, it serves through an agreement between producers and air pilots to establish temporarily a noiseless zone. Aviators keep clear of the balloons by at least 2,500 feet; and a rule of the United States Department of Commerce and ordinances of cities in which motion pictures are made provide penalties for non-compliance with such regulations.

Stabilized and Lighted

The first balloon of this type was sent up recently by the Metro-Goldwyn-Mayer studio in Culver City, Calif., and it has proved so satisfactory that such gas-filled rubber bags are likely to become standard equipment in sound-picture making. The bag is tinted orange-red, is pear-shaped, 28 feet long, 17 feet in diameter, contains 4,500 cubic feet of hydrogen, and has a kitelike tail with a stabilizer to keep it from bobbing about like a spherical balloon. It is held with a mooring rope, which also supports a light double electric cable and several yard-long pennants, and is usually floated at from 500 to 600 feet in the air. For night work the balloon carries on its top a 1,000-watt orange-red light, while two 500-watt lights depend from the cable to give the quiet-zone warning. In the accompanying picture is shown the filming of a day scene in "The Bishop Murder Case."

It is in indoor work, however, that rubber finds not only more but many unique and valuable applications in sound-motion-picture production. The big inclosed stages of steel

and concrete offer problems in sound control that are in a way even harder to solve than those in the open air. True, the spacious stages may be well shielded from external noise by giving them double walls, but the echoes and reverberations within them remain to be controlled. Sponge rubber was first sought as a covering for walls, and would have been preferred, but so much would be required that engineers contented themselves with a cheaper material, a specially treated felt, with which they say they can reduce sound vibrations within walls by 50 per cent. As sound-deadeners for floors of stages the choice of covering is made between rubber tiling, ground cork attached with a water-soluble cement, and heavy, lined carpet.

Cushioning Doors, Machines, Etc.

Sponge rubber is quite considerably used as a cushion stripping around the huge doors of sound stages and also as a lining for parts of camera booths. The rubber is a well-vulcanized tread stock having a strong texture and good resilience. It is supplied in slabs 1 inch thick, 4 inches wide, and 40 inches long, and is spliced with acid-cure cement. Apparatus operated with electric motors is commonly mounted on a base having a

cushion of either sponge or non-porous tread stock rubber; in fact, when machinery must be positioned on a stage close to a scene being filmed, such vibration-absorbing material is indispensable.

Some microphones are still hung in front of players with wires, but many careful producers will take no chances with such supports, preferring instead rubber shock-absorber cord such as used for exercising machines or on the landing gear of airplanes. The "mikes" suspended with such cord are said to be immune from the vibrations which are often caught by wire-hung "mikes" and which are, of course, recorded on the edge of the sound films to the detriment of the latter.

Rubbered Cameras and Booths

Since the advent of the "talkies," the effective utilization of the old motion picture camera in the new art has given sound engineers much anxiety. The cameras must often be



Balloon Warns Airplanes to Keep Away While Sound Pictures Are Being Filmed

placed quite close to players speaking their lines, and the grating due to the winding and unwinding of the film is only too readily taken up by the listening "mikes" that hang about the stage. In the days when only silent pictures were made, the camera was free of all incumbrances and could be as easily carried about as a surveyor's theodolite. Now for making sound pictures it must be so heavily shrouded as to prevent even the slightest noise from its mechanism being caught by the "mikes." First the whirr of the machine was almost as audible on the screen as the dialogue. This trouble was largely overcome when the camera was placed in a booth partially lined with rubber and felt and having a 2½- by 5-foot plate glass front through which the photographing was done. But it took from eight to ten men to move the booth about, and the operator was almost suffocated.

Better ventilation was finally provided. Heavy rubber casters made the moving of the booths easier, and windows replaced the big glass fronts that caught so many reflections; and at last the camera was taken out of the booth and the whirr of its working parts muffled with rubber and felt insulation. In spite of all this the microphone would often catch some of the internal noise, especially if the camera came too close, the sound being transmitted apparently through the telescoping cylinders holding the lenses. Finally a so-called "baby booth" has been devised to remedy the trouble, and it seems to be effective. It is 3 feet long, 1½ feet wide, and 2½ feet deep. It is made of heavy fiber, lined with either sponge rubber or felt, edged with duralumin, and is easily carried about on a tripod.

The newest camera fitted for sound motion work, although it is not yet standardized as many modifications may be found necessary in adapting it to the needs of the new art, wears a veritable armor of rubber, a fine black sponge material used in various thicknesses. The two film roll holders on the top have a ⅛-inch rubber sheathing; the aluminum-alloy camera frame has its sides encased with like material; the view-finder on one side has a ¼-inch rubber covering, and the turret on the opposite side, set behind the focusing and photographing lenses, and containing shutters and other revolving parts, has a coating of ½-inch rubber. In the trials given the new camera thus far results are said to have been quite satisfactory.

Hushed Magazines, Special Cable

Rubber has come to the relief of the sound engineer in many other odd ways. The noise made in moving a film through a camera having been quite overcome, still another noise persisted. It was traced to the round, flat metal magazines set over and under a camera and into which a film is rolled or unrolled. This trouble was got rid of by cementing disks of sponge rubber to the sides of the magazines, attaching flat, thick, soft rubber rings to the rims, and inserting soft rubber spools in the magazine hubs.

The mere scuffing of a player across a carpet on a sound stage has been known to cause a spark of frictional electricity which, in jumping to an electric cable beneath the carpet, made a click through the "mike" that necessitated the re-taking of the scene, often with much loss of time. Metal instruments brought near such covered cables often caused similar trouble by inducing current from the cable, and even variations in or the switching on and off of the current passing through the cable would be caught by the too-attentive "mike" and help to spoil a film. This difficulty has been quite effectively overcome through the use of a special type of rubber-insulated cable, in fact so much so that it has been adopted as standard equipment for the thirteen channels or sound stages, the largest outfit of its kind, at the Paramount-Lasky studios in Hollywood, Calif.

The conductor of the cable consists of stranded copper wires having a double serving of cotton, an inner insulation of treated paper, a heavy outer insulation jacket of high quality rubber, and the whole incased with a stout braiding of fine tinned copper wires. The anti-induction effect is obtained by grounding the wire braiding.

Rubber Cements

(Continued from page 60)

luids are added to latex in alkaline solution and usually contain a preservative such as sodium fluoride. A gel forms when a high percentage of glue is added to latex, but this quickly liquifies on warming and the cement is then ready for use.

Cements made from celluloid in acetone or amyl acetate have recently been introduced, particularly in the boot and shoe industry, with a certain amount of success. The solvents used are very poisonous and while lacking the flexibility of rubber, the surfaces joined with celluloid tend to curl when subjected to heat.

Balata and gutta percha cements are still used in the electrical trades, carbon disulphide being the chief solvent employed.

Progress in rubber cement manufacture has mainly developed on the advances made in vulcanization and the direct use of latex, and all improvements in these two branches of the rubber industry will be reflected in the process of cement manufacture.

Manufacture of Tire Treads

(Continued from page 62)

Segmental sections used with the drum form an annulus of frusto-conical design completely surrounding it and enclosing the male die member. Each section carries a matrix plate for forming the outer peripheral portion of the tread band, the plates being removable from the sections.

In curing treads, a band of rubber or rubber compound is placed around the drum and the segmental sections manually positioned about the band. Hot water or steam is then admitted to the chamber. The mold is placed beneath the head and the piston actuated to force the head down about the segments which will obviously be forced inwardly toward the drum.

(To be continued.)

October Tire Statistics

Tire manufacturers in the United States produced 4,918,912 pneumatic casings during October, according to Rubber Manufacturers' Association estimates. Total production of inner tubes is estimated at \$5,309,711 and total production of solid and cushion tires at 46,101 for the month.

Total shipments during October are estimated as follows: pneumatic casings, all classes, 4,959,676; inner tubes, 5,001,437; solid and cushion tires, 47,725. Inventories as of October 31 are estimated as 12,844,538 for all pneumatic casings, 13,655,866 for inner tubes, and 147,832 for solid and cushion tires.

The tire industry is estimated to have consumed a total of 55,699,924 pounds of crude rubber and 18,275,557 pounds of cotton fabric during October in the manufacture of all types of pneumatic casings, inner tubes, and solid and cushion tires.

These estimates are based on reports furnished by manufacturers who produce approximately 75 per cent of the total for the United States.

Fabrics Used in Rubber Belting

W. L. STURTEVANT AND J. E. SKANE

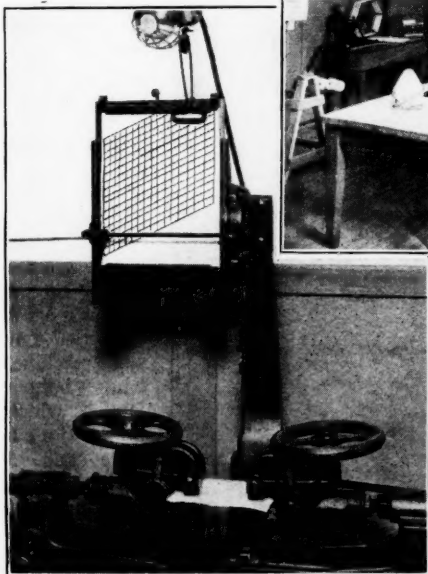
RUBBER belting is divided into two general classes: power transmission and conveyer and elevator. The Rubber Manufacturers' Association states that the sales value for rubber belting produced during 1928 was \$17,000,000.

Classes of Belting

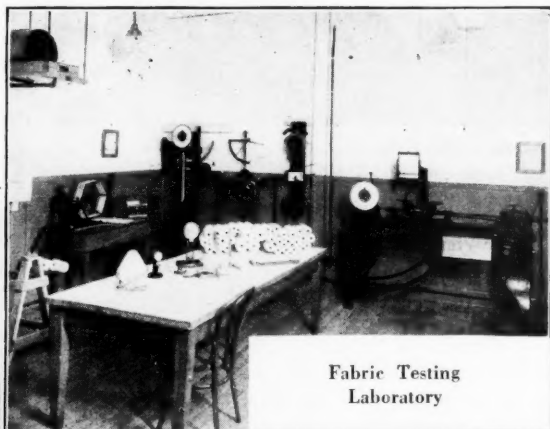
Fabric has been described as the backbone of a rubber article. This is true not only of mechanical goods, such as belting, hose, and packing, but of tires as well. Rubber belting for the transmission of power is made up of about 52 per cent of fabric and 48 per cent of rubber compound. It is evident that such an important item as fabric should receive the highest consideration from a technical standpoint. Committee D-13 of the American Society for Testing Materials has during the past few years accomplished results which have been highly beneficial to both the fabric and rubber industries. They have succeeded in standardizing test methods and fabric constructions, and have aided fabric and rubber manufacturers in coming to a clearer understanding.

Types of Fabric

Fabrics for belting uses are divided into two principal classes: hard, or silver ducks, and soft ducks. They are further classed according to the weight of a piece of belting fabric that measures 36 by 42 inches.



Grab Test—Scott Horizontal Test Machine

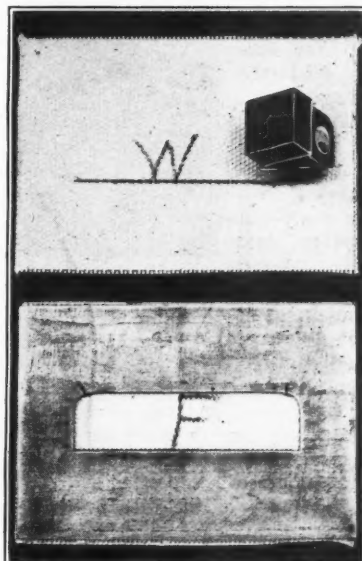


Fabric Testing Laboratory

This unit is the basis upon which all belting fabrics in this country are recognized. Hence, what is known as a 28-ounce belting duck is actually a section of fabric of dimensions 36

by 42 inches, weighing 28 ounces. The soft fabrics, as their designation indicates, are constructed to give a soft and pliable piece of goods.

While both soft and hard fabrics are employed in the manufacture of rubber belting, a much larger amount of the soft fabric is used than the hard. The latter has been in limited use for many years, but of late it seems to be coming into more general use in certain classes of



Grab Test Sample

power transmission belting, such as saw mill planer work, and on high speed motors.

The more common weights of belting fabrics are 24, 28, 32, and 36-ounce in the soft weaves, and 32.7 and 34.4-ounce in the hard weaves, although the 24-ounce soft is but slightly used.

Analysis of Fabrics

The cotton used in belting fabrics is a commercial 1-inch staple cotton, actually averaging about $\frac{1}{16}$ -inch. Its grade is middling, and is known either as Atlantic States Cotton or Western Cotton.

TABLE 1
ANALYSIS OF REPRESENTATIVE BELTING FABRICS

	Nominal Actual		Ply	Yarn		Count	Per Cent		Gage
	Weight	Weight		Size	Size		Crimp	Inch	
Soft	Oz.	Oz.	W F	W F	W F	W F	W F	W F	
Fabrics	24	5 x 4	6 3/4 x 6 1/4	25 x 13 1/2	22 x 7	.053			
	28	6 x 5	6 3/4 x 6 3/4	24 x 13	22 x 3	.061			
	32	7 x 6	7 x 7	23 x 14 1/2	24 x 3 1/2	.067			
	36	7 x 7	6 x 7 3/4	24 x 13	24 x 4	.070			
Hard	33	32.7	7 x 5	9 x 8	31 x 19	23 x 3	.054		
Fabrics	35	34.4	8 x 5	8 x 8 1/2	27 x 18	23 x 3	.058		

W=Warp. F=Filling.

In Table 1, yarn size means the number of 840-yard hanks of cotton to the pound, avoirdupois. That is, No. 1

yarn has 840 yards to the pound, and No. 7 yarn has 7 times 840 yards to the pound. The count is the number of strands of plied yarn to the inch. The first set of figures is the warp count, and the second set is the filling count.

The ply is the number of strands of single yarn, twisted together into one strand of plied yarn. The crimp is the difference in distance between any two points of the yarn as it lies in the fabric, and the same two points after the yarn has been removed from the fabric and straightened, expressed as a percentage of the distance between the two points as the yarn lies in the fabric. Gage is the thickness of the fabric measured by an automatic micrometer, which presses upon a circle $\frac{3}{8}$ -inch in diameter of the fabric with a pressure of 6 ounces.

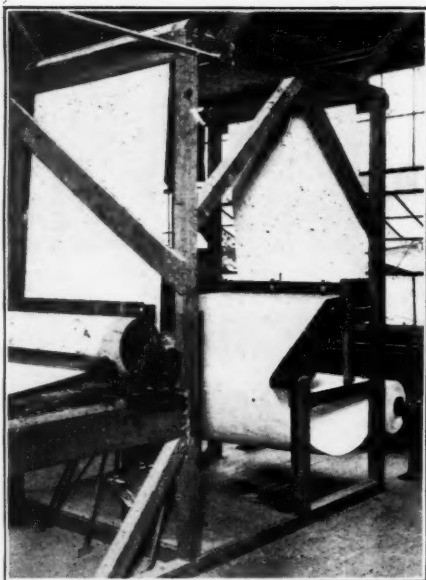
It will be noted that beginning with 28-ounce, the increment of weight is 4 ounces for the soft weaves and 2 ounces for the hard weaves when based upon the nominal weights. The yarn size for the soft ducks will average about 7's, but in order to maintain the weight with the construction outlined, the yarns are either decreased or increased a fraction of a number, with 7's as the mean.

Keeping the yarns, the count, and the crimp approximately constant, the increase in weight is primarily obtained by increasing either the warp or filling plies of yarn, or in some cases, both warp and filling plies. An increment of .003-inch is apparent for each 4 ounces of weight between the 28-ounce fabric and the 36-ounce fabric.

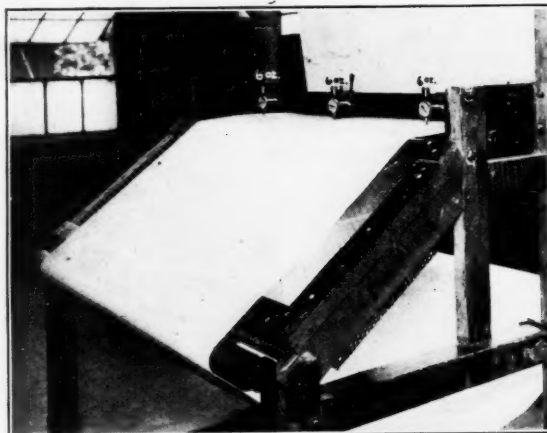
Direct analytical comparisons cannot be made between the 33-ounce and the 35-ounce fabrics because of their application to different types of work. The 33-ounce hard fabric is used as a direct substitute in some cases for 32-ounce soft, where a belt is required to do excessively hard work or to transmit power at a high speed.

The 33-ounce and 35-ounce fabrics have a harder and harsher feel than the so-called softer fabrics. These physical properties are obtained by closing up the fabric; that is, by crowding more warp ends and filling picks in a unit space.

Let us compare 32-ounce soft and 32.7-ounce (33 nomi-



Inspection
Platform



Upper—Artificial Light
Panel of Inspection Table

Right—Inspection Table
(Rear View)

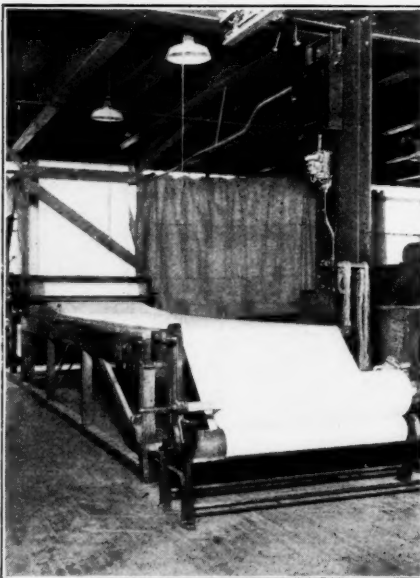
nal), which when made into belts are used interchangeably. Certain advantages are claimed for belts made from 32.7-ounce hard duck over belts made from 32-ounce soft duck. These advantages in performance and physical properties are believed to be gained not so much by the increase in weight, but rather because of the differences in construction. The yarns are finer in the 32.7-ounce, and there are eight more warp ends and $4\frac{1}{2}$ more filling picks per inch in this duck than in the 32-ounce soft. The 32.7-ounce is also .013-inch thinner than the 32-ounce soft; this reduction in thickness is an advantage when the fabric is made into a belt. The other advantages of the 32.7-ounce duck belt will not be discussed in this paper, since it is deemed sufficient to mention that there are advantages to be gained through the use of this duck.

Fabric Strength Tests

Table 2 shows the indicated strengths of the belting fabrics contained in the analysis under Table 1. All strength tests were made by the American Society for Testing Materials' grab method, and each figure shown is the result of approximately 500 tests.

Before testing, samples are allowed to hang suspended in a room maintained at a standard atmosphere of 65 per cent relative humidity and a temperature of 70° F. for at least 4 hours. The testing room is lined with a double wall of insulating material, and regulated ventilators allow for changes of air. Humidity conditions are maintained by means of a fan and rotor type humidifier. The rotor dips into a pan of precooled water and is driven by air currents generated by the fan which is placed directly behind the rotor. A hair hygrometer regulates the humidity of the room.

The test samples are cut out of the fabric by a template which also lines up the plied strands of yarn, so that both jaws of the test machine will grip exactly the same strands of yarn in the direction of tension. Tests of strength are made on a standard horizontal tension machine, the bottom jaws of which are 1 inch wide and 3 inches long. The top jaws are 1-inch square, and



the distance between opposite gripping jaws is 3 inches. The rate of separation of jaws is 12 inches per minute.

TABLE 2
COMPARISON OF FABRIC STRENGTHS

	1 Weight of Fabric Ounces	2 Strength (Grab)		4 Indicated Total Strength	5 Increment of Strength			Percentage of Total Strength of Fabric	
		Warp	Filling		Warp	Filling	Total	Warp	Filling
Soft Fabrics	24	435	210	645	..	..	67.5	32.5	
	28	490	266	750	55	50	105	65.4	36.4
	32	550	300	850	60	40	100	64.8	35.2
	36	630	346	970	80	40	120	65.0	35.0
Hard Fabrics	32.7	660	350	1,010	..	..	65.4	34.6	
	34.4	760	310	1,070	100	40	60	72.0	28.0

Discussion of Strength Tests

The indicated strengths along the direction of the warp and those along the direction of the filling are shown under the second and third columns of Table 2. Their arithmetical sum is shown under column 4. Columns 5, 6, and 7 show the increments of strength for warp, filling, and total, respectively, as the weight of fabric increases.

Between each of the soft fabrics there is a 4-ounce difference in weight. The increment of 4 ounces between 24-ounce and 28-ounce shows a total strength increment of 105 pounds; while the increment between 28-ounce and 32-ounce shows a strength increment of 100 pounds; and between the 32- and 36-ounce, the increment is 120 pounds. It is interesting to note also that a greater percentage of this variable increment is in the warp, whereas the filling, while lower, is nearly constant.

The 34.4 hard fabric shows an increase in total strength over the 32.7-ounce as the weight increases, but not in the same relation of increment as the soft ducks increase. Again, as in the soft ducks, the increase in strength is in the warp, this time at the expense of the filling.

The distribution of strengths based upon total strength of fabric is shown in columns 8 and 9. Since belt requirements demand the greater strength along the direction of the warp, long experience and research have placed the distribution of strengths approximately 60 per cent plus along the warp and 40 per cent minus along the filling. As shown in Table 2, a very good distribution is approximately 65 per cent of the total strength in the warp and 35 per cent in the filling. The exception to this case is that of 34.4-ounce fabric wherein the warp contains 72 per cent of the total strength and the filling 28 per cent. However, this weight of fabric, although employed in transmission belting, is nevertheless used for a very special purpose.

Inspection of Fabrics

Besides laboratory analysis to determine the quality and suitability of fabrics for belts, a necessary adjunct is the inspection table. This piece of apparatus aids in examining the fabric for weaving defects, tinged cotton, thickness, appearance, and straightness. The roll of fabric is drawn over a glass plate, under which powerful light bulbs are placed. Here may be seen such defects as broken warp ends, warp

knots, slugs, split yarn, dirty cotton, etc. At the same time, the roll is inspected for width and count along 10 inches of fabric, both warp and filling.

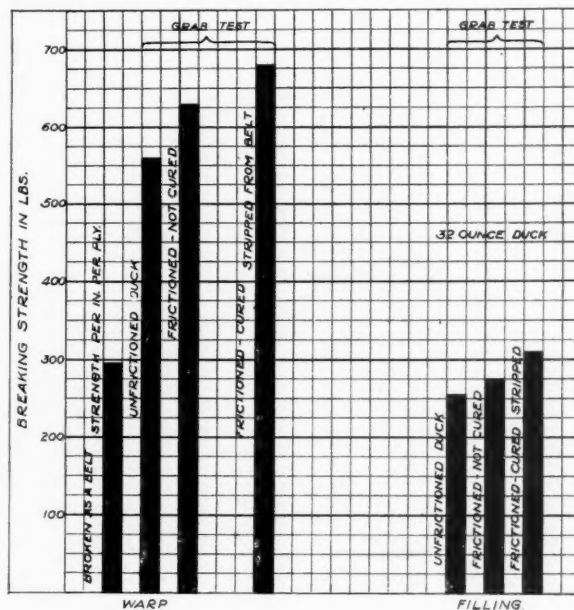
Just above the artificial light plate are the gages, made to the American Society for Testing Materials' recommendations. The feet of the gages are $\frac{3}{8}$ -inch in diameter, and these exert a pressure of 6 ounces on the fabric. From under the gages the fabric passes over rollers, and is drawn in front of a natural light window, where it is examined for color and reed marks. Passing overhead and then down, the fabric is drawn through a length measuring machine and over a long table, after which it is "put up" again in the form of a roll.

Another visual inspection may be made when the fabric is lying flat on the table. This last inspection is ideal for determining whether or not a fabric is straight or baggy, or if it contains tight or slack selvages. Special emphasis is placed upon careful examination of the fabric at the inspection table, since the operating performance of a belt depends so much upon the weaving properties.

Comparison of Frictioned and Unfrictioned Fabric

To observe the indicated strength behavior of a fabric during process through the rubber factory, a sample of 32-ounce duck was selected and was tested unfractioned, and again after frictioning. The remainder of the fabric was plied up in the usual manner and made into a belt, and vulcanized at a factory standard pressure, time, temperature, and stretch.

After curing, part of the belt was stripped down into



separate plies and was tested according to the grab method as were the unfractioned and the uncured frictioned samples. Against these the belt was tested as a unit, and the results were computed on a strength per ply inch basis. The results are graphically illustrated on the accompanying graph, which shows that the unfractioned duck has an indicated strength along the warp of 560 pounds. This same piece of fabric, when frictioned with a high grade rubber belt compound, has a strength of 680 pounds, which is an increase of 70 pounds, or 12.5 per cent more than the bare duck. After vulcanization, the strength of this frictioned fabric reaches 680 pounds, a further increase of 50 pounds, or 7.3 per cent over the frictioned unvulcanized sample, and 120 pounds, or 21.4 per cent greater than the unfractioned sample.

When this same frictioned duck is plied up and cured as a belt and tested as a unit, there is no relationship between the types of test and the results that are obtained on the single plies of fabrics. In one case the grab test is used; in the other the full width of belt is tested. But if comparisons are desired, it is found that when tested as a belt, the indicated strength of this fabric is 295 pounds per ply inch, or 47.3 per cent less than the unfractioned fabric when tested by the grab method. When comparing the 295-pound per ply inch belt test with the frictioned uncured sample, the former is found to be 53 per cent lower than the latter. If the test of the frictioned and cured fabric

stripped from the belt is compared with the belt per ply inch test, it is found that the per ply inch test is 56.6 per cent lower than the grab test on the single ply.

Taken along the filling, the increase in strength is as follows: The frictioned over the unfriktioned duck 10 per cent; the frictioned and cured duck over the unfriktioned 21.5 per cent; and the frictioned and cured duck over the frictioned uncured duck 12.7 per cent. The belt was not tested because it was of a narrow width and could not be handled successfully in the belt testing machine.

An exact explanation of the above is rather problematic. But it is a fact that the surfaces of the cotton are surrounded by unvulcanized or vulcanized rubber films; and it is within the realm of probability that the curled ends of the cotton fibers are tied more closely together by the rubber, and that the coefficient of friction of the surfaces of the fibers is increased so that slipping of the fibers upon one another is delayed as the fabric is frictioned, and again after the frictioned fabric is vulcanized.

A belt made of cotton, the plies of which are joined by rubber, is strong, flexible, tough, and powerful, and, as H. P. Gurney¹ says:

"It is not often realized that on a weight basis cotton is

¹J. Textile Inst., Vol. XVI, No. 9, 1925.

stronger than steel. The tensile strength of the cotton fiber is in the vicinity of 75,000 pounds to the square inch of cross-section, whereas the highest piano steel wire may reach 250,000 pounds to the square inch. Ordinarily, steel may be taken at 90,000 pounds tensile strength, and 30,000 pounds would be a good figure for the tensile strength of cotton in a cord. This would appear as three to one in favor of steel, but since the density of air-dry cotton is 1.51, while that of steel is 7.85, it will be seen that cotton, volume for volume, is 5.2 times lighter than steel. Hence, for a given weight, cotton is 1.5 to 2 times as strong. If a rigid element of structure is desired, steel must be employed, but if a more extensible element is desired, the engineer must turn to cotton. For the highest degree of extensibility, the engineer, however, must employ rubber."

With these facts in mind, the belting engineer combines cotton with rubber, in the proper proportions, in the manufacture of rubber belting.

NOTE: Publication permitted by *Ind. Eng. Chem.* Paper read before the Division of Rubber Chemistry at the Fall Meeting of A. C. S., Atlantic City, N. J., Sept. 26-28, 1929. The authors are connected with The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.

Rubber Division A.C.S.

New York Group

THE New York Group of the Rubber Division, A. C. S., held its last 1929 meeting on December 16, in The Town Hall, 123 West 43d St., New York, N. Y. About 175 members were present.

The retiring secretary-treasurer reported unexpended funds on hand of \$250 which Chairman Wiegand proposed be donated to *Chemistry and Technology*, and this motion was unanimously accepted. The following officers were elected for the ensuing year. Walter L. Sturtevant, chairman, and Kenneth Soule, secretary-treasurer, the former being chief chemist and the latter assistant chief chemist, Research Department, The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.

The 1929 series of group meetings was well attended, and the symposiums presented were interesting and helpful without being excessively scientific.

The papers read related to rubber-fabric combinations current in rubber goods production. Abstracts of these papers follow.

RUBBERIZED BALLOON FABRICS. The preparation of fabric envelopes for gas cells and balloonettes in spherical balloons, blimps, and rigid airships was described in detail. Mention was made of gold-beaters' skin, aluminum powder, and paraffin as coating materials. The functions of the different types of fabrics were explained and their structural arrangement shown by diagrams. Some information about compounding the rubber was included. R. P. Dinsmore.

RUBBER-FABRIC COMBINATIONS IN RUBBER FOOTWEAR. The type of fabrics commonly used in rubber footwear construction are: (1) woven fabrics, *a.* cotton, sheetings, etc., *b.* cotton and wool, cashmerettes, etc.; (2) knitted fabrics, *a.* cotton netts, *b.* wool, jersey, *c.* cotton and wool, fleeces for linings. Rubber is applied by calender or spreader according to the type of fabric and its function in the shoe. Woven fabrics are frictioned, skimmed, or spread as required. Knitted fabrics are always skimmed on even motion calender

to retain free stretching quality afforded by the knitted structure. This is a necessary condition for fitting these goods over the shoe lasts. A. R. Davis.

RUBBER AND PYROXYLIN FABRICS. The essential features sought by combining rubber and pyroxylin or nitrocellulose with fabric for automobile roofing are the flexibility and waterproofing properties of rubber and the permanent luster and ease of graining given by pyroxylin. The rubber composition, dissolved as cement by the usual means, is spread upon the fabrics which are doubled. Nitrocellulose is dissolved in suitable solvents and pigments, and a non-drying oil added to give color and flexibility. Pyroxylin dope is spread on the doubled fabric. The fabric is then embossed and given a finish coat of pyroxylin varnish. K. E. Burgess.

RUBBER-TEXTILE COMBINATIONS FOR TRANSMISSION BELTING. Designing these combinations involves study of the following points: A. Frictioning with relation to (1) different compounds and the effect of rubber content and fluxes, (2) different fabric supplies and weight, (3) the physical condition of the textile material, moisture content, and temperature, (4) the physical condition of rubber batch, plasticity, heat and speed of calendaring. B. Durability of combination as a function of thickness of rubber layer. The effect of varying plies of skim on (1) friction tests, (2) flexing cycles, (3) dynamometer life. C. Durability of combination as a function of compounding. (1) Flexing tests on unskimmed belts of different compounds, (2) same both frictioned and skimmed. D. Artificial aging shows results depending on (1) initial state of cure and (2) length of aging period. E. Comparison between volume cost and volume of rubber deposition on the fabric. W. L. Sturtevant and D. P. Weisberg.

STRENGTH AND STRETCH OF DOUBLE TEXTURE GOODS. In double texture combinations the textile fiber is used to give strength while retaining resiliency and stretch necessary for the intended use of the processed fabric. It is difficult to

meet the conditions of strength and stretch imposed on plied fabrics of this sort without sacrificing much of their available strength. A considerable waste of materials can be traced to this difficulty. It is possible to calculate approximately the correct stretch properties of fabrics so that double textures will have the desired characteristics without undue sacrifice of raw materials. Methods of rubber application and the effects on the properties of the finished product are outlined. T. M. Knowland.

EFFECT OF PROOFING PROCESSES ON TENSILE STRENGTH OF FABRICS. Cotton and rayon fabrics before and after coating were studied to determine a basis for selecting fabric specifications for more satisfactory fabric constructions. The goods tested were cotton lawn, sheeting, duck, drill, flannel, rayon and cotton mixtures, and all rayon. The proofing processes were: spreading, calendering, and combinations of both processes. Methods of curing were by vapor, liquor, dry heat, and open steam. Tests were made entirely on uncoated and on finished fabrics. The results indicate that the lighter weight, higher count fabrics increase in strength proportionately more than the heavier, lower count fabrics, and the filler more than the warp. Manner of coating shows the greatest differences in effect; while some differences are shown by weight and quality of fabric. Nature of the weave makes the greatest difference. Rayon is not much affected by rubber coating because of the smoothness of its fiber, but the weave influences the strength increase. Type of cure does not greatly alter fabric strength except in dyed fabrics which may be affected adversely by heat. Coating both sides of a fabric increases strength additional to coating one side only. Coating a napped surface produces rather slight improvement. Filler strength of fabrics for specific purposes should be judged according to the weave and manner of coating. R. R. Lewis.

Akron Group

The Akron Rubber Group of the A. C. S. met at the Firestone Club House on the evening of December 9, with 250 members in attendance. Dr. W. K. Lewis, of the Massachusetts Institute of Technology, gave a very interesting talk on "The Amorphous State." Dr. Lewis' talk consisted in large part in a plea for more clear-cut teaching of the subject of colloidal chemistry. It was pointed out that even the obvious facts are not clearly stated in our university courses. In consequence the student goes out into the industrial field in a state of bewilderment with few or no facts as a basis upon which to build his further experience. Dr. Lewis expressed hope that the men in the chemical industries would use their influence in trying to get more effective teaching of the subject. The talk was very well received and elicited a lively discussion.

The paper by H. C. Young, of Charles MacIntosh & Co., Ltd., Manchester, England, on "Some Engineering Problems

of Rubber" did not arrive in time to be presented at the meeting.

The following officers of the Rubber Group were elected for the coming year: C. W. Sanderson, Goodyear Tire & Rubber Co., chairman; W. E. Shively, also of the Goodyear company, vice chairman; and L. W. Brock, Godfrey L. Cabot Co., Inc., secretary-treasurer. The new officers assumed their duties the first of the year.

Chicago Group

The Chicago Rubber Group announces its first meeting for 1930 to be held at Maillard's, Michigan and Jackson Blvd., Chicago, Ill., Friday, January 17, at 6.30 p.m. "Modern Developments in Control Instruments for the Rubber Factory" is the topic for the occasion. This will be treated in papers by the following speakers: L. J. D. Healy, Fisk Rubber Co., Cudahy, Wis.; E. L. Stilson, Akron office, The Bristol Co., Waterbury Conn.; and R. E. Olson, The Taylor Instrument Companies, Rochester, N. Y.

Early application for dinner tickets is desirable and should be made to B. W. Lewis, secretary, 365 E. Illinois St., Chicago, Ill.

Los Angeles Group

Following the dinner at the ninth meeting of the Los Angeles Group of the Rubber Division, A. C. S., at the Pollyanna Tea Room, on Friday evening, December 20, an interesting talk was given on "The Goodrich System of Wage Payment," by E. W. Matthis, staff superintendent of the Pacific Goodrich Rubber Co., Los Angeles, Calif. A general discussion followed, and Mr. Matthis answered many questions.

The group, at the suggestion of Mark Walker, accepted an invitation to attend a session at an early date of the Los Angeles Section, A. C. S., when Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*, will be the honor guest.

The following officers for the ensuing year were elected: President, Dr. F. W. Stavely; vice president, F. S. Pratt; secretary-treasurer, Dr. W. R. Hucks (reelected).

Rubber Division Notes

Harold Gray, of the B. F. Goodrich Rubber Co., Akron, O., has been appointed a member of the Executive Committee of the Rubber Division of the A. C. S. to take the place of Arnold H. Smith, of the Rubber Service Laboratories, who was recently transferred to London.

The Executive Committee of the Rubber Division of the A. C. S. held a business meeting at the University Club in Akron, O., on December 14.

Rubber Manufacturers' Association

Meeting and Dinner

THE fifteenth annual meeting of The Rubber Manufacturers' Association, Inc., will be held in West Ballroom of the Hotel Commodore, Lexington Ave. and 42d St., New York, N. Y., beginning at 10:30 a.m., Monday, January 6, 1930.

The regular order of business will begin at 10:30 a.m. A luncheon is to be served at 1:00 p.m. to all in attendance, without charge. Following luncheon, opportunity will be given for discussion of any subjects in which members may be interested. It is the earnest wish of the officers and directors that all firm representatives be on hand promptly

at 10:30 a.m. and that everyone stay for lunch and participate in the informal discussion which is to follow.

The thirtieth annual dinner will take place in the Grand Ballroom of the Hotel Commodore, on Monday, January 6, 1930, at 7:30 p.m. Tickets ten dollars. Ladies will be admitted to the balcony boxes which hold six persons, at 9 p.m. Tickets are required and should be applied for on the regular ticket form.

It is especially important that the dinner begin on time. Everyone is therefore urged to be punctual in order that the ballroom may be opened to the guests at 7:30 p.m. sharp.

EDITORIALS



The Goldenrod Rubber

A PRESS announcement that Thomas A. Edison, expects soon to supply rubber from the goldenrod plant, *Solidago Virgaurea*, at 16 cents a pound is denied by an aide who states that no price estimate has been made on the rubber which the famous inventor counts on extracting from this or other plants with which he has been experimenting. Newspapers have led their readers to expect perhaps too much of Mr. Edison. Because he has been testing out thousands of plants, just as he tried thousands of materials before finding one efficient for an incandescent lamp filament, they freely predict early success in his hunt for cheap and abundant home-grown rubber, apparently little realizing, as doubtless he does, the difficulties which beset research in that direction, nor how much success may depend, too, on the production of utilizable by-products.

Mr. Edison said some time ago that he sought not so much a product to compete with commercial rubber as a material of which the nation might quickly avail itself in ample quantity were the rubber supply endangered by war or natural disaster. As to the latter, recent experience with the Mediterranean fruit fly in Florida reminds us of what can happen. A generation ago a blight so devastated the Far East coffee lands that their disheartened owners abandoned coffee and sought solace and found profit in rubber growing; and although history may not soon repeat itself, it is well to be vigilant. In brief, Mr. Edison's main and laudable object is one of national preparedness. It is possible that goldenrod, long the bane of hay-fever victims, may one day prove a boon to the country.

While much is heard about one plant's possibilities, the potential usefulness of other promising rubber-yielding growths being intensively studied on American soil by government, industrial, and educational agencies is almost overlooked. Little is said about *Cryptostegia grandiflora*, the milkweed varieties, *Asclepias subulata*, the rabbit bush, *Chrysothamnus nauscosus*, and many other plants that are known to possess rubber producing possibilities.

The outstanding American success is, of course, guayule, *Parthenium argentatum*, developed with great pains and expense from a wild southwestern shrub into a domesticated plant, grown commercially as far north as latitude 39, which can be cultivated and harvested as a staple crop.

Its rubber content has been so increased and the extraction process so improved that the product can vie in price and quality with some of the best grades from foreign sources.



For Fair Tire Profits

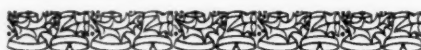
THE recent rumor that some leading tire manufacturers would moderately raise tire prices strikes a responsive chord throughout the rubber industry generally. It must also gratify the many trades supplying tire makers' equipment and materials, for all have been at a disadvantage with tires too cheap and profits on them too scanty. When compared with other lines, tire manufacturing has long been non-lucrative. Indeed, economists say that in order to afford stockholders a reasonable return on their investment, the tire industry as a whole should have paid in, for instance, the eight years from January 1, 1920, to Decem-

ber 31, 1927, at least \$200,000,000 more in dividends than it disbursed. To that sum they would add capital losses of \$350,000,000, or a disadvantage of over \$500,000,000.

The best friends of the industry hope that the tire makers will "consolidate" their position. Achievement of the reasonable gain sought will promote welfare and inure to the benefit of the country. Only when its industries function profitably can a community really flourish.



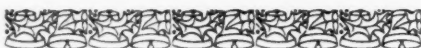
A GOOD SUGGESTION FROM OVERSEAS IS THAT IN MARKETING rubber goods designed to replace those of leather, the use be banned of any reference to "artificial leather" or any term suggesting mere substitution. With the remarkable improvement made of late years in rubber compounding there is no need to apologize for rubber wares intended to replace leather. On the contrary, many rubber products are decidedly superior to leather, and need but a generous measure of publicity to make buyers realize rubber's surpassing qualities.



New Year's Greetings

May endeavor bring our industry to the fore, and you with it.

May the New Year fill your coffers with plenty, your hearts with gladness, and your lives with sunshine—and each succeeding year be better than the past.



What the Rubber Chemists Are Doing

The Role of Oxygen in Carbon Black¹

C. R. JOHNSON

IT WAS the purpose of the investigation discussed in this paper to fix more definitely the status of oxygen and to find what influence, if any, it has on the properties of black when used in rubber.

Effect of Oxygen on Carbon Black

According to Freundlich,² in the case of true gaseous adsorption there exists an exact equilibrium between the amount of gas adsorbed on a surface and the concentration of the same gas in contact with that surface. Such being the case, if oxygen be present as a truly adsorbed gas on carbon black, then the concentration of adsorbed oxygen should be diminished if black be placed in an oxygen-free atmosphere. A sample of black was placed in an atmosphere of nitrogen, and after each 24 hours a portion of the sample was removed for volatile matter determination. At the same time the nitrogen atmosphere was renewed. It had already been determined that for all of the blacks used in rubber there was a definite ratio between the oxygen content and the volatile matter content, which averages 0.863. Table 1 shows that there is no diminution of oxygen as a result of exposure to pure nitrogen.

The objection might be raised that the data in Table 1 are not conclusive because after exposure to nitrogen the black, for a short period, is exposed to the atmosphere and possibly could take on oxygen again before the volatile matter determination was made. As a check on this point another test was run in which the black was soaked in nitrogen gas in a quartz tube for 2 days. The volatile matter determination was made directly in the quartz tube without exposing it to the atmosphere. The same sample of black was used as in making the determinations reported in Table 1. The volatile matter decreased from 5.80 per cent at the start to 5.72 per cent after 2 days in nitrogen. From this it can reasonably be assumed that the oxygen content of carbon black is in a more definite chemical relationship to the carbon than strictly gaseous adsorption.

Table 1

Period in Nitrogen Days	Volatile Matter Per Cent
Start	5.75
1	5.63
2	5.84
4	5.90
7	5.79
9	5.77
13	5.76

¹Carbon Black II—The Role of Oxygen. Presented before the Rubber Division of the American Chemical Society, Atlantic City, N. J., Sept. 26-28, 1929.

²Alexander, "Colloid Chemistry," Freundlich, p. 575.

Addition of Oxygen

Another experiment was made to determine whether or not the carbon black could be made to take on oxygen in a strong oxygen concentration. A sample was exposed to a sample of liquid air containing 50 per cent oxygen for 15 minutes and for 6 hours, with the results shown in Table 2.

Table 2

Treatment of Sample	Volatile Matter After Exposure for	
	15 Minutes Per Cent	6 Hours Per Cent
Before exposure	3.99	3.99
After exposure	4.20	4.31
After exposure and 20 hours in air	4.07	4.26
After exposure and 68 hours in air	....	4.18

It would appear from the results in Table 2 that carbon black is not completely saturated with respect to oxygen, and that if oxygen is added, it is in fairly stable condition, as the volatile matter loss is only slightly reduced after long exposure to air after the black has been in liquid oxygen for 6 hours.

Another study was made to throw more light on the possibility of the addition of oxygen. It had been observed that when carbon black was heated in the presence of air sometimes oxygen was added and sometimes it was removed from the carbon black. As a general rule, oxygen was removed at temperatures above 500° C. and added at temperatures below 450° C. Two runs were made as follows:

TEST 1—Heated for 5 minutes at 90-150° C., passing air over crucible placed in electric muffle furnace. Removed to desiccator and weighed. Volatile matter determined.

TEST 2—Heated for 5 minutes at 275-325° C. Other conditions the same as in Test 1.

The results of these two tests are given in Table 3. It was assumed that the net change in carbon could be represented by the weight of the residue after each volatile matter determination. This is substantially correct, except for a small amount of hydrogen in the residue.

Table 3

Tempera- ture ° C.	Before Heating			After Heating				
	Loss on Heating %	Vola- tile Loss %	Mois- ture %	Net Vola- tile Loss %	Vola- tile Loss %	Mois- ture %	Net Vola- tile Loss %	Carbon Loss %
90 to 150	8.52	6.45	1.16	5.29	5.99	0.47	5.52	0.37
275 to 325	7.96	6.45	1.16	5.29	6.09	0.45	5.64	0.37

The results of these two tests indicate that whenever equilibrium conditions are favorable for the addition of oxygen, it takes place, and that the loss in carbon calculated from volatile matter residues is

about equal to the gain in volatile matter after heating to temperatures of 90-325° C. in the presence of air. According to an equation derived by Duerr, the gain in volatile matter should be about 2 to 3 times the loss in carbon, thus:

$$\frac{W''V' - WV}{(W - W' - W'' - W''')} = \frac{7 \text{ to } 11}{3}$$

where W' = dry weight of original sample
 W'' = dry weight after increasing oxygen content

V' = volatile matter before heating

V'' = volatile matter after heating.

The factor $\frac{7 \text{ to } 11}{3}$ takes into account the

fact that the oxygen comes off as a mixture of CO and CO₂.

The ratio of the gain in volatile matter to the loss in carbon is less than 1 and does not conform to the expectations of the equation, but the difference can be explained by the fact that there is a greater loss in weight during heating than can be accounted for by the difference in the moisture before and after heating. Apparently some volatile matter loss takes place even at the low temperature of heating, and while the black was being oxidized and increasing in its volatile matter capacity, there was a definite carbon loss.

Removal of Oxygen

Having shown that it is possible to add oxygen to carbon black, it is now advisable to consider the possibility of removing it. It has already been shown³ that it is possible to remove it in part by heating in the absence of air at temperatures above 500° C. The experiment was tried by treating the carbon black with a powerful reducing agent, zinc dust being chosen as the reagent. An intimate mixture of 20 per cent zinc dust and 80 per cent Cabot's black from the Bowers plant was treated as follows: (1) heated 1 hour under vacuum at 370° to 400° C.; (2) heated 2 hours under vacuum at 370° to 400° C.; (3) mixture (enough for rubber test) heated 1½ hours under vacuum at 370° to 400° C. The gain in weight after heating was 0.158 per cent in Test 1 and 0.135 per

cent in Test 2. The volatile matter run under vacuum at 800° C. for 7 minutes was, in Test 1: carbon black (without

³C. R. Johnson, *Ind. Eng. Chem.*, 20, 904 (1928).

zinc dust), 3.23 per cent; unheated mixture, 0.85 per cent; heated mixture, 0.92 per cent. In Test 2 it was: heated mixture, 0.54 per cent. In Test 3 it was: unheated mixture, 1.04 per cent; heated mixture, 0.89 per cent.

The results of the rubber test on the original black and on the heated mixture are given in Table 4.

Period of Cure, Minutes	Tensile at Break		Elongation at Break, Per Cent	Modulus at 400% Elongation	Hardness Shore Durometer
	Lbs. Per Sq. In.	Kg. Per Sq. Cm.			
	ORIGINAL BLACK				
40	4,035	284.2	640	1,710	62
60	4,100	288.7	623	2,060	65
80	4,250	299.3	603	2,265	68
HEATED MIXTURE					
40	3,830	269.7	617	1,750	62
60	3,900	274.6	567	2,180	67
80	4,025	283.4	580	2,130	68

A mixture of 20 per cent zinc dust and 80 per cent Cabot's black from the Bowers plant was heated for 4½ hours at 400° C. After 1½ hours the apparatus was disconnected, a small sample was removed, and the mixture was stirred, after which heating was resumed under vacuum.

	Volatile Matter Per Cent	Iodine Per Gram Black
Carbon black (without zinc dust)	3.15	0.130
Zinc dust .....	...	3.627
Zinc oxide .....	...	None
Unheated mixture	1.34	0.715
Heated mixture (1½ hours) .....	...	0.419
Heated mixture (4½ hours)	2.26	0.376
Heated mixture (4½ hours) exposed to air for 3 days ..	2.06	...

The volatile matter in the mixture run under vacuum at 800° C. for 7 minutes and the adsorption of 0.1 N iodine by the mixture are shown in Table 5. In testing the heated mixture, it was assumed that the zinc dust had changed to zinc oxide and correction was made in the test formula.

The combustion analyses are shown in Table 6.

	Heated Mixture Per Cent	Original Black Per Cent
Carbon	77.28	93.18
Hydrogen	1.25	1.06
Oxygen	1.77	5.76
Ash	19.60	None
Moisture	0.67	1.20

From the data in Tables 5 and 6 it is evident that the volatile matter is considerably reduced even before the mixture is heated, which shows that the oxygen has been removed from combination with the carbon and has reacted with the zinc dust to form zinc oxide in the process of volatile matter determination. In the case of the iodine adsorption, the amount found on the unheated mixture is almost exactly 20 per cent of the amount for pure zinc dust, so that practically no iodine goes to the black in that instance. With the heated mixture, the iodine adsorption falls off, owing to the fact that some of the zinc dust has gone over to the oxide, which has no adsorptive capacity for iodine.

It might be argued that the zinc oxide is formed by reaction of the zinc with the carbon dioxide, rather than directly with the oxygen. From a consideration of heats of formation, the facts that ordinarily

gases are not evolved from carbon black at temperatures as low as that used, that there was no appreciable loss in weight in the heated mixture, and that there was no appreciable gas evolution during heating indicate that this reaction involves the taking of oxygen from the carbon by the zinc, without the intermediate formation of carbon dioxide.

The next step appears to be to try the reducing effect of hydrogen at various temperatures and pressures. If hydrogen is effective, it might have a practical as well as a theoretical interest, from the possibility of changing the properties of carbon black in its various uses. At any rate, it can now be asserted that the oxygen of carbon black is not so firmly attached to the carbon that it cannot be removed without appearing as carbon monoxide or dioxide.

Adsorption Phenomena

Sebrell and Carson's work⁴ on iodine adsorption was concerned with blacks produced by different processes, and there is some question as to whether or not it is safe to generalize from data under such conditions. It was deemed advisable to study the adsorption of iodine and some organic accelerators by rubber blacks which were known to vary widely in the volatile matter content, and consequently in the rate of vulcanization of rubber. In the case of unheated blacks, there is no correlation between iodine adsorption and the amount of volatile matter in black, or in the rate of cure of the black when used with rubber. When samples of black from the same factory are considered, however, it is usual to find that the iodine adsorption varies directly with changes in volatile content. Studies of adsorption of two accelerators, Captax and DPG, by a number of blacks indicate that accelerator adsorption varies directly with volatile matter (oxygen content). This applies not only to samples from a given factory but throughout a number of sources. The exception which Sebrell and Carson noted with heated blacks, namely, that iodine adsorption was increased and volatile matter decreased, accompanied by more rapid curing rate, is confirmed.

Taking the ideas developed in this and other papers, it begins to be clear now why carbon black with high volatile matter (or oxygen content) gives poor physical properties when vulcanized with rubber. Such black clearly has the property of adsorbing more organic accelerator than a normal black, with the result that there are established innumerable foci of incompletely vulcanized points throughout the rubber mixture caused by the conjuncture of a black particle, rubber nucleus, sulphur particle, and reduced accelerator concentration. This leads to a reduced average strength throughout the mass, and consequently lower tensile and lower modulus. The lower rate of cure is clearly explained by the reduction in accelerator concentration. For over two years the writer has been studying the possibilities of overcoming the phenomenon of accelerator adsorption. The investigations here reported have been fa-

vorable, and concurrent examination of the new product by several rubber manufacturing companies has demonstrated that carbon black in which accelerator adsorption is largely inhibited can be made. Extensive tests over a period of 8 months in a large manufacturing laboratory have indicated that this new black has physical properties 20 per cent better than normal channel black. Test tires are now on the road to confirm the preliminary abrasion results.

Titanium Pigments

Titanium Pigment Co., Inc., 60 John St., New York, N. Y., producer of titanium oxide and titanium pigments for rubber, paint, and other purposes, has announced a change of designations applying to its products as follows:

Titanox B (barium base) is the pigment formerly designated as Titanox. It consists of 25 per cent of titanium oxide precipitated upon and coalesced with blancfixe.

Titanox C (calcium base) is the pigment formerly known as titanium calcium pigment. It consists of 30 per cent titanium oxide precipitated upon and coalesced with calcium sulphate.

During the past year the company has expended more than \$500,000 in improving manufacturing facilities to keep pace with expanding business.

Phenex

The accelerator Phenex is comparable to the aldehyde-amine class of accelerators but is distinctly different in nature. It is a clear amber colored liquid having a specific gravity of about 1.02. It is only slightly soluble in water but soluble in most of the ordinary rubber solvents. It is very soluble in rubber and, being a liquid, fluxes easily, giving perfect dispersion. It is entirely stable and shows no signs of decomposition after a period of more than a year of storage under ordinary conditions. It is non-poisonous, will not cause any kind of rash in any weather. It will not stain and can be used in white or light-colored stocks without material deterioration. Phenex will cure in a relatively long period at 20 pounds of steam, but is preferably used for curing at 30 pounds or above. Its critical point is higher than many common accelerators, and it is entirely free from scorching effect in ordinary mill and calender practice.

Zinc oxide is necessary to bring out the best curing effect of Phenex although curing will take place in the absence of zinc oxide. The aging qualities of Phenex are superior to those shown by the aldehyde-amines, but it is rated as an accelerator rather than an antioxidant.

Coumarone Resin

Coumarone resin 77 M. P. is now available for rubber compounding purposes in a very light colored form suitable for use in white rubber products. It serves too as a rubber softener where exceptional adhesiveness is required. Also the very soft coumarone resins in light colors have found great favor in rubber cements.

⁴ Carson and Sebrell, *Ind. Eng. Chem.*, 21, 911 (1929).

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"A Business Man and Organizer"

"It's the young man we want to encourage." Expressive hands emphasized the Institution of the Rubber Industry's creed, uttered by Virgil Cox, secretary since 1922.

Difficult it is to realize that one so young as he could have accomplished so much. Tall and lanky, good-looking, unruffled dark hair, well groomed, Mr. Cox looks his part—a business man and organizer. His



W. F. V. Cox

eyes, deep brown, are so alive. They reflect his every mood. Humor captured them as he recalled amusing incidents in America, such as when he and Dr. Winkelmann were mistaken for bishops in Atlantic City. Or his hands. Never still, that welcome a cigarette, play with a pencil, or toy nervously with his tie when questions required personal information. Not from this man does one learn of the activities he has conducted for the IRI, with its fellowships, meetings, educational programs, and magazine.

An invited guest, Mr. Cox addressed the Rubber Division meeting at Atlantic City and disclosed his mission—to unite and educate further British and American rubber workers. He hopes to do this with *Rubber Chemistry and Technology* of the Rubber Division of the A. C. S. and *IRI Transactions* of the Institution of the Rubber Industry.

"Don't you see what a big thing it would be? All the rubber papers in the English language and even translations from foreign sources would be in the physical possession of these men."

In coming to America in September,

Mr. Cox stopped first at Montreal. He is planning a Canadian section to the IRI, as recently formed in Australia. It would provide for better cooperation with the States. Already he is arranging a London meeting of all groups in 1931.

"What do you think of America?"

"I had a wonderful time while I was here. I enjoyed the finest hospitality from the minute I arrived. I was always taken care of. The people welcomed me and took me right into their homes."

"Atlantic City?" The brown eyes twinkled merrily, but no answer.

An ardent golf fan, playing the game whenever possible, Mr. Cox considers meeting Glenna Collett, America's foremost woman golfer, while the guest of John W. Herron, a most agreeable experience. The IRI secretary lectured at Akron University and visited several rubber plants. He went up in Nick Firestone's plane as his first passenger.

Mr. Cox has another absorbing interest, "cooperative advertising." He holds that the rubber industry should join other industries to widen the market for rubber goods.

"The rubber industry for the time and energy expended has comparatively small returns, you know."

So, with footwear: "Don't sell rubbers; sell health protection."

The garden hose trade may be expanded through seed companies. But the European automobile industry, according to Mr. Cox, presents the fertile field to tire manufacturers if they would help increase the demand for motor cars. It could be done in Britain by negotiating for the repeal of discouraging taxes. The levy on petrol is not so bad. But a car owner must pay annually £1 per horse power; thus the yearly tax on a 14 h.p. automobile is £14.

"You are married, Mr. Cox. You have a little boy?"

"Yes." Eagerly, "Would you like to see his pictures?"

Already those busy fingers were fumbling with a wallet. Out came Peter, age 22 months, an adorable English lad.

Walter Felix Virgil Cox was born in London on January 11, 1897. His school is Ongar, Essex. When sixteen, ill health compelled him to drop classes. After recovering, he did not continue his formal education. He resides in Kent. He has written a paper on cooperative advertising, and is gratified by the fruition of some of his ideas.

Mr. Cox claims many uses for rubber are not fully developed. Roadways, for instance. One London bank even offered part costs for rubber paving outside its building, because it realizes rubber is superior to other materials.

"If only some great financial concern would say we guarantee this rubber road for a definite period, it would sell the roads. Even in your own country," he added, "great possibilities exist. Take your bridges. They could be improved with rubber."

He might have continued. But bridges bring thoughts of travel, and travel means good-bye. A pleasant farewell; he was gone, a business man and organizer—and how!

New Machines and Appliances

Improved Bolton Bias Cutter

THE well-known Bolton bias cutter, familiar in every rubber plant where tires are manufactured, has undergone various developments to meet the requirements of greater accuracy and speed of production. It is important to note that all the improvements embodied in the latest model are applicable to the Bolton cutters now in service.

The changes consist of a new cutting arrangement comprising a continuously running endless chain which carries several cutting knives. This improvement replaces the former reciprocating action operating a single knife, and is an important feature. It not only makes the machine run with greatly increased smoothness and produces much cleaner cut work but also by reason of the increased speed of cutting, the new arrangement of knives tends to eliminate the inaccuracies occasioned by the pull or drag of the old type of single knife cutting.

The improved machine is equipped with a link belt conveyer system so arranged that it will remove the fabric cuts of any width or angle and discharge them as rapidly as produced onto a horizontal conveyer. From the latter the cuts can be spliced into continuous lengths or be made into the usual "pockets" as the system demands.

The illustration represents the improved machine from its delivery side and shows the link belt conveyers descending to the horizontal conveyer. The latter comprises a number of narrow rubber belts operating

in unison on top of a bench boxed in at the sides with corrugated sheet metal.

The machine is further provided with a new method for supplying the fabric to the feed roller and practically eliminates the possibility of any inaccuracy of cutting due to defects in calendaring or in the weave of the goods. Spadone Machine Co., 15 Park Row, New York, N. Y.

Tire Bead Making Machine

THE accompanying illustration represents a combination tire bead making and covering machine of unique design, which embodies three outstanding features. These are: first, the bead wire is lapped tightly into the grooves of the wheel and is soldered without being removed; consequently there are no loose turns; second, the covering is tight and holds the wires securely in exact position; third, the quantity and quality of production is high. One man can turn out complete and perfect beads at the rate of 120 per hour.

Briefly, the operation is as follows: The fabric is fed from a liner twelve strips wide and after one round is cut off. The wires are fed in from twelve reels and after the predetermined turns are made, the wires are cut off. Means are provided to treat the ends with acid after which a solder tray is moved into place and all twelve wire coils are soldered at the same time.

An additional revolution of the machine folds the fabric tightly around the group

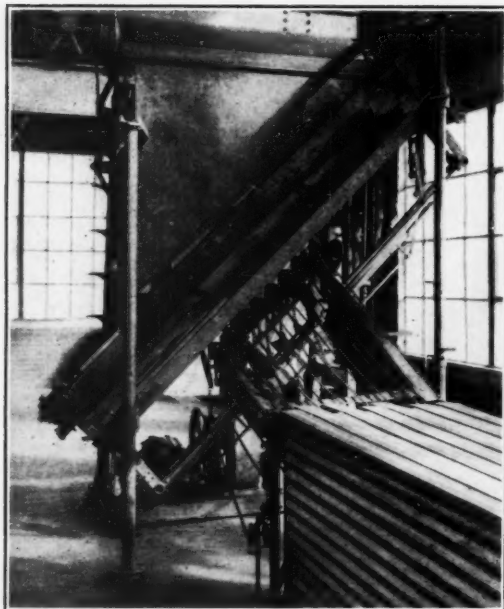
of wires to complete the beads, which are then removed by collapsing the drum. Utility Manufacturing Co., Cudahy, Wis.

Two-Stage Rubber Plasticator

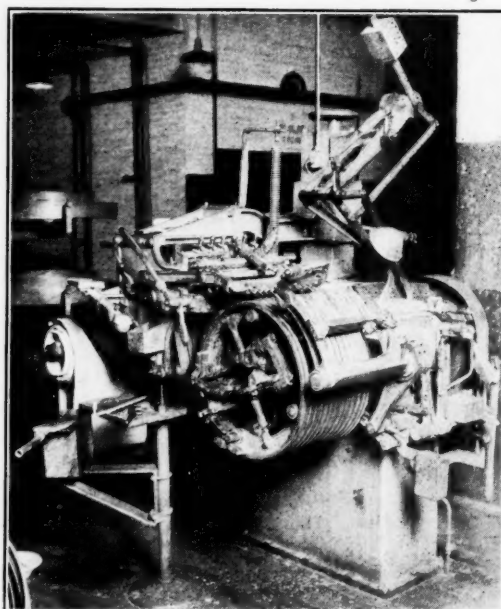
THE first machine designed for plasticizing crude rubber was put into production two years ago. The experience gained meantime has led to perfecting the two-stage plasticator here illustrated. This machine turns out broken-down rubber at the rate of about 5,500 to 6,500 pounds per hour, according to the nature of the material and the degree of plasticity desired. The two-stage machine has almost doubled that production with a drop in temperature of product to 250° or 260° F.

One man can feed two machines providing the rubber is transported to him at the level of the hoppers. Only one man is required at the delivery end of each machine, but unless he has an automatic cutting off machine and other men provide him with empty racks after removing the filled racks, he will be overwhelmed with the machine's production.

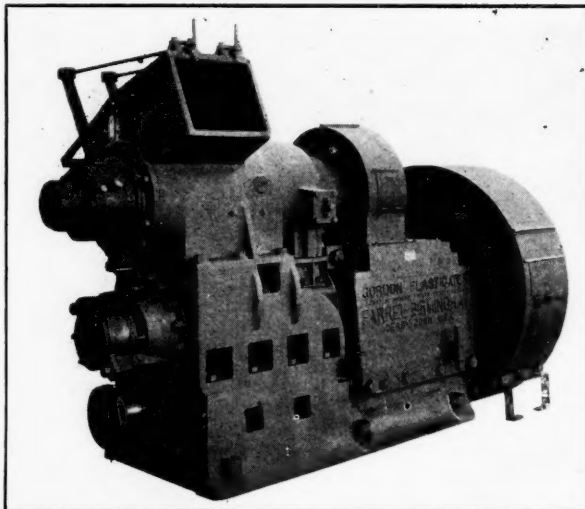
The plasticator comprises two conveying worms, mounted in cylinders one above the other. These worms differ in design and have different effects on the rubber passing through. A bale of smoked sheet cut into 3 to 6 pieces, according to conditions, is brought to the hopper of the upper cylinder by a belt conveyer where the operator feeds it into the machine. The hopper, made right and left, is 24 inches



Improved Bolton Bias Cutter



Utility Bead Maker and Coverer



Gordon Rubber Plasticator

long by 20 inches wide, and located 7 feet 8 inches above the floor level.

The upper worm mangles the rubber and carries it to the rear of the cylinder. Thence the partly broken rubber passes through a passage into the lower cylinder where the second screw forces it ahead through a kneading or masticating chamber and extrudes it in tubular form, 6 to 7½ inches in diameter. It is cut into pieces about 30 inches long and placed on racks for transportation to the compounding room.

Rubber passed once through the plasticator is soft enough for most purposes. However, as there is much variation in the plasticity of rubber even in the same equipment, double plastication is occasionally required to average the lot in softness. To obtain the greatest reduction in plasticity during the second pass, the rubber should be allowed to become cold before reworking.

The two-stage plasticator pictured weighs about 84,000 pounds including the 500 h.p. drive but not the motor. All bearings both radial and thrust, are roller type, and all gears are steel and run in oil. Those between the motor and rotor are double helical, continuous tooth type, and the connecting gears driving the upper rotor are single helical designed so that their end thrust favors the roller thrust bearings.

A 500 h.p. motor, running from 500 to 600 r.p.m. is recommended to operate the machine. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Mechanical Molding Press

A NEW type of press for molding mechanical rubber goods, pyroxylin plastics, casein, fiber, and other synthetic plastics is here pictured. This is an absolute mechanical press and a complete molding unit, electrically driven and controlled by push button, reversing and limit switches. This outstanding feature eliminates the necessity of hydraulic pressure and expensive hydraulic accessories, and marks another step forward in the art of

molding. Greater production, less spoilage, lower operating costs, and negligible maintenance costs are a few of the advantages to be gained with the use of this equipment.

The press is started in motion by simply pressing the proper button. When the press reaches the end of the stroke, the motor is automatically stopped by a limit switch. The motor is used only to open and close the press. On the

Hand molds may be used or each half of the mold may be attached to the platens, making the press semi-automatic. The extraction or opening force is equal to the closing force, owing to the press design. Timing devices for any particular requirements may be installed on the press, thereby making it practically automatic, and enabling one operator to handle more than one press. Terkelsen Machine Co., 326 A St., Boston, Mass.

Scrap Inner Tube Cutter

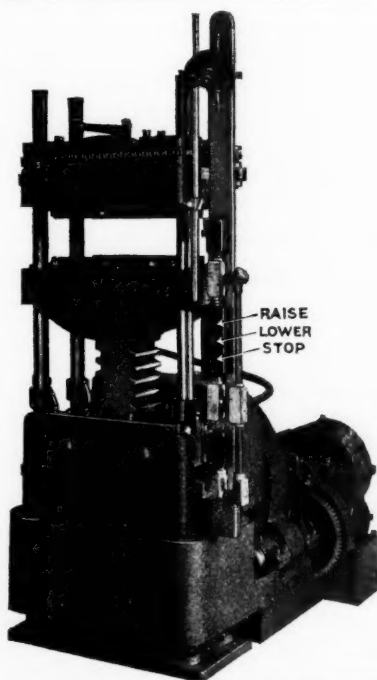
THE accompanying illustration represents the mechanism of a small compact cutter designed for reducing inner tubes and other light scrap to short pieces. It is chiefly used by exporters to cut automobile inner tubes into approximately two-inch lengths for shipment to foreign countries. It is also used by reclaimers to prepare inner tubes for final reduction by grinding. The construction of the machine is indicated in the illustration, which shows a side elevation with parts broken away.

In operation, the tubes are fed by hand from the inclined feed box *A*, passing under a V-grooved, small feeding roller *B*, which revolves immediately above and close to a heavy steel bed knife *C*. The tubes are cut off at this point by a set of four knives, one of which is marked *D*. These are bolted to the squared sides of a head, formed integral with the main shaft and balance wheel, as a single malleable casting.

While the head is built to take four knives, only two are used when cutting inner tubes. The revolving blades and the bed knife all have two cutting edges so that when one edge dulls, the knife can be reversed and the opposite edge brought into action.

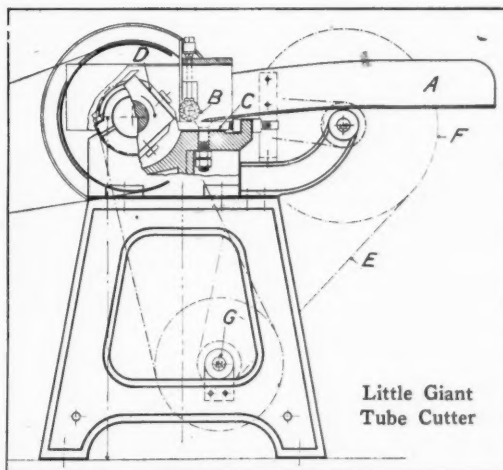
The spring tension feed roller *B* is driven from the main shaft by means of a chain and sprocket drive *E* and *F* through the counter shaft *G* to get the proper speed of the feed. The cutting effect resembles that of a lawn-mower, that is the revolving knives are set on the head at a slight angle to give the correct shear against the bed knife.

The advantages of the machine are its

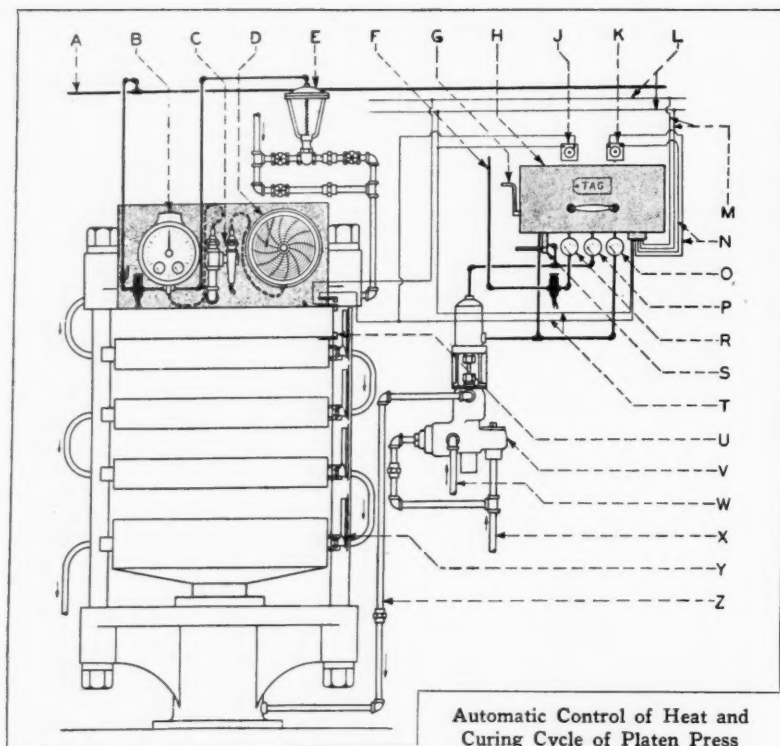


Terkelsen Electro-Draulic Press

pressure stroke, 4 heavy coil springs are compressed, acting as an accumulator, maintaining constant pressure and the "follow-up" necessary in this type of molding. During the curing period the motor is not running. Pressure and stroke are adjustable from zero to maximum and the change can be made in 5 seconds. This permits a 50-ton unit to be used for any capacity up to maximum. These presses may be obtained for any tonnage, number of openings, size of platens and stroke.



Little Giant Tube Cutter



compactness, its all steel and iron construction, and small power consumption, giving large cutting capacity. The small spring tension roller holds the tubes so that they are cut into practically uniform lengths. This length is adjustable from $\frac{1}{4}$ to 4 inches or more, if desired, by changing the sprockets or cutting with two revolving blades only. Taylor, Stiles & Co., Riegelsville, N. J.

Platen Press Cycle Controller

STANDARD practice in representative rubber factory press rooms calls for an automatic temperature controller, recording thermometer, and several indicating thermometers. Correct vulcanization of the rubber product depends also on automatic control of the curing cycle.

A typical installation of this group of instruments for automatic operation of a platen press is indicated in the diagram, the operating procedure of which is as follows: Proper curing temperature is fixed by inserting a clock key into the key post of the controller *B* and turning the pointer for a higher or lower temperature. The thermometers *V* in each platen are checked with the recording thermometer *D* to make certain that all platens are free from water and air pockets; thus assuring uniform temperatures throughout the press. The cycle controller *H* with its train of cams is the next unit for consideration. Each cam is set by simple adjustment to time the cure.

All being in readiness, for production work, each attendant removes a mold from the top platen and loads it with heel blanks. Both molds are returned to the press. When the attendant in front of

the press ascertains that his coworker at the rear has properly located his mold, he pulls the starting lever *G* at the left side of the cycle controller *H* to close the press. He has nothing to do with low and high pressure hydraulic valve *V*. He has no time-piece to watch. The press is opened automatically at the end of the cure.

The lever *G* starts the motor located on the left side of the case *H* revolving the train of cams to the starting point. The motor stops as soon as the cams are in position. At the same time compressed air at 60 pounds pressure is introduced above the piston of the cylinder mounted on the two-pressure hydraulic operating valve *V*. The downward thrust of the piston admits low pressure hydraulic to press and the press closes. With its closing high pressure hydraulic is automatically introduced. From this precise moment the train of cams revolves to regulate the time period of the cure. As the press closes, an electrical circuit *T*

is established through a switch mounted on the uppermost platen of the press. An electric clock now revolves the set of cams and lights a white signal lamp *J* which continues to glow until the end of cure.

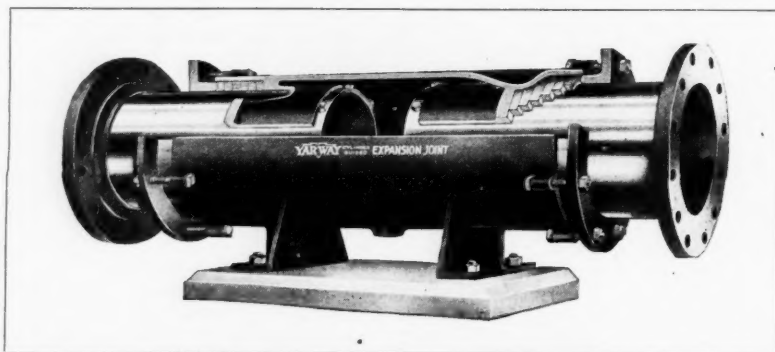
A red lamp *K* is automatically lighted 15 seconds prior to the termination of the cure and remains lighted until the next cure is started. A counter is provided to indicate the number of complete operations performed by the press.

The emergency lever *S* serves several purposes. If the operator starts the controller *H* without the molds having been properly centered or before either attendant has his hands clear and discovers the unsafe conditions as the press is closing, it is simple to pull the emergency lever *S* which releases the hydraulic almost instantaneously, opening the press. The lever *S* may also be used for "bumping" the press without operating the counter which is so connected that it functions only with the termination of the cure. The controller regulates the time of cure to the second. It is not possible for the attendant to shorten a cure—the instrument *H* properly locked prevents unauthorized persons from tampering with it. C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

Expansion Pipe Joint

RUBBER plant engineers will be interested in the cylinder-guided expansion joint of which the double type with base is here pictured. Its design and construction embody a number of special features of practical importance. The body is of steel. The cylinder guide and stuffing box are integral to insure perfect alignment. The sliding sleeve is well away from the inside body dirt pocket. The construction allows easy access for adjusting the gland and repacking the large, deep stuffing box.

The sliding sleeve is chrome plated steel, cylinder guided. The length of the guide is ample to provide proper alignment of the sleeve. The standard sizes range from $2\frac{1}{2}$ to 24 inches and are furnished packed or unpacked. The type of packing depends upon the conditions under which the joints are to be used. Sizes from $\frac{3}{4}$ to 2 inches are all of bronze construction. Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pa.



Double Type Cylinder-Guided Expansion Joint

Editor's Book Table

Book Reviews

"Native Rubber in the Dutch East Indies, Report to the Rubber Growers' Association." By V. A. Tayler and John Stephens. Issued by The Rubber Growers' Association, Inc., 2-4 Idol Lane, Eastcheap, London, E. C. 3, England. Paper, 48 pages, 6 by 9¾ inches. Map and numerous illustrations.

This report embodies the results of a systematic survey by organized plantation interests of rubber production by native growers. The work was undertaken to obtain first-hand information on the extent, condition, and possible future output of native grown rubber.

The investigators' field work covered conditions in the Residencies of Pontianak and Banjermasin in Borneo and of Lampongs, Palembang, and Jambi in Sumatra. Their findings in each Residency are reported under geography and topography, population, climate, communications, cultivation, rubber, planted area, tapping output, preparation and marketing, labor and future production, and economic position.

The results of their study are presented in a summary of estimates tabulating planted areas and potential as

distinguished from probable outputs for the years 1929 to 1933 inclusive.

"A Chemical Dictionary." This contains the words generally used in chemistry, and many of the terms used in the related sciences of physics, astrophysics, mineralogy, pharmacy, and biology, with their pronunciation. Based on recent chemical literature. By Ingo W. D. Hackh. 1929. P. Blakiston's Son & Co., Inc., 1012 Walnut St., Philadelphia, Pa. Cloth, 790 pages, 6½ by 9¾ inches. Tables, diagrams, portraits, and other illustrations.

The need of a dictionary of this sort is apparent to chemists and others who realize the rapid progress of chemical and allied sciences, and whose work and reading bring them in contact with the terms of the new concepts of matter and energy. The book is a pioneer effort of great practical value for students, analysts, and research chemists generally, in whatever branch of chemistry or chemical technology they may be interested.

"Foreign Markets for Rubber Boots Shoes, Heels, and Soles." Section IV, European countries. Rubber Division, Dept. of Commerce, Washington, D. C.

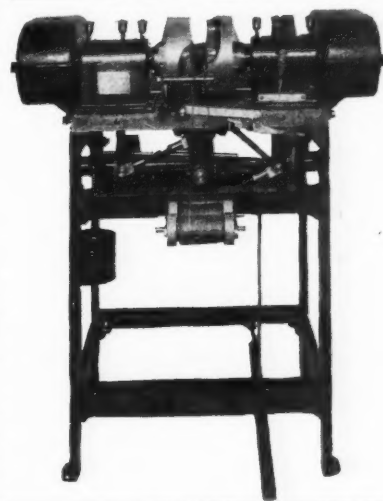
"Rubber Sundries." Davol Rubber Co., Providence, R. I. New 40-page illustrated catalog of Davol products.

"Dealers' Stocks of Tennis Shoes in the United States." Special Circular No. 2534, Rubber Division Dept. of Commerce, Washington, D. C. The object of this survey is to determine the carryover of stocks by dealers at the end of the season.

Golf-Ball Winder

THE demand for golf balls is so extensive and the specifications for their construction, weight, and size so exacting, that extreme accuracy is required in winding the rubber thread cores.

A favorite winder, specially designed for this work, is represented in the illustration.



Corona Golf-Ball Winder

This machine weighs about 500 pounds, operates by fast and loose pulley from a line shaft, and requires about ½ horse power. It is full ball-bearing, requires only ordinary care to keep it in working order, and can be successfully operated by any person after a few hours of practice.

The machine winds two threads simultaneously with any desired tension at the rate of 50 to 70 cores per hour. The core is turned three ways at each revolution, and broken threads can be restarted without stopping the machine. The machine winds cores for 1.62 or 1.68 balls and on pills ⅝ to 1⅜ inches in diameter, with automatic stop. Huntingdon Mfg. Co., Meadowbrook, Pa.

New Publications

"Bristol's Recording Pressure and Vacuum Gages." Catalog No. 1,009 issued by the Bristol Co., Waterbury, Conn., contains very complete information on its particular division of the company's recording instrument line. The book is fully illustrated, supplemented with a complete index of charts available for use with all of these instruments. It is highly valuable for reference purposes and should be in the hands of all process engineers.

"Twenty-ninth Year Book—1929," issued by The Rubber Manufacturers Association, Inc., lists the names of its officers, board of directors, standing committees, and firm members of the various divisions of the Association. Three supplemental pages record the Association necrology for 1929.

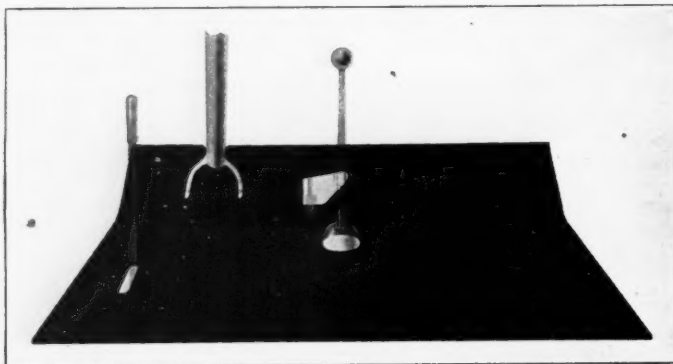
"The Rubber Exchange of New York, Inc., Fourth Annual Report, 1929." This report is submitted by F. R. Henderson, president of the Rubber Exchange, who summarizes the activities of the year's dealings from September 1, 1928 to August 31, 1929. The total number of contracts on the exchange for the year was 188,132 or 470,330 tons, representing

a value of \$217,000,000. Transferable notices, representing deliveries of physical rubber, amounted to 7,937 lots, equivalent to 19,842½ tons, an increase of 24 per cent over last year's deliveries.

"Guide to the Preparation of Plantation Rubber in Ceylon." This indexed book of 60 pages by T. E. H. O'Brien is issued by the Rubber Research Scheme (Ceylon). The work discusses approved field and factory operations for the conduct of tapping and collecting latex and the preparation of the various standard grades of plantation rubber.

"The British Rubber Industry." Special Supplement, November 19, 1929. *The Daily Telegraph*, London. In this 40-page issue the technical and trade aspects as well as general forms of rubber manufacture other than tires are comprehensively treated by well-known rubber chemists and manufacturing authorities. Articles of chief interest include: rubber supply, modern plantations, new services for rubber, vulcanization and research, mixing practice, flooring and tiling, rubber in the household, in garments, footwear, and sports, salesmanship and marketing, and London as a rubber market.

New Goods and Specialties



Lea Carpet

Pile Carpet with Rubber Base

THE industrial application of rubber has been broadly extended by the process of water dispersion. One of its applications of particular interest to the motoring public is the manufacture of floor coverings or carpets for automobiles. These fabrics have a surface resembling woven pile goods but are of unique construction and provide many distinct advantages over woven carpet.

In their production, weaving methods are abandoned in favor of a new and patented construction whereby a luxurious pile surface of exceptional durability is built up of individual tufted fibers. These have no felting properties like wool and do not wear and break each other by useless and destructive friction when walked upon as do the fibers in woven yarns. The manufacturing process is much simpler and faster than the spinning and weaving operations incidental to the production of woven pile goods.

Patented machinery is employed to cut in suitable lengths the pile material from a bolt and embed the curved base portions of the pile tufts in a water dispersed rubber composition which securely attaches it by vulcanization to a strong woven fabric base. This makes it possible to utilize in a pile fabric a type of fiber especially adapted for carpet wear, but yet unavailable for extensive use in standard carpet weaving because of the limitations of such processes.

Vulcanization attaches every fiber in the pile to the base and any short or loose fibers are combed out in the finishing. Therefore there is no shedding of fiber in service. The separate fiber construction makes it easy to clean the carpet by brushing or vacuum cleaner without injury. For the same reason, oil and grease stains are readily removed by light sponging with gasoline or naphtha. Their vulcanized construction renders the carpets free from all tendency to ravel. It may therefore be slit, perforated, and cut to

templates to fit any shape, as for example, the floor in both front and rear of passenger automobiles. Lea Fabrics, Inc., 768 Frelinghuysen Ave., Newark, N. J.

Rubber Rugs

BRILLIANTLY hued rubber rugs add color and tone to the bathroom. Bath mats are regularly used also for service in the bathtub or shower as well as on the floor. The A-B-C bath mat, here illustrated, is made of live resilient rubber about $\frac{3}{8}$ -inch thick and soft as velvet. It will outwear a fabric rug; yet costs less. It cannot slip or wrinkle. The mat is made in beautiful, rich colors, with the designs

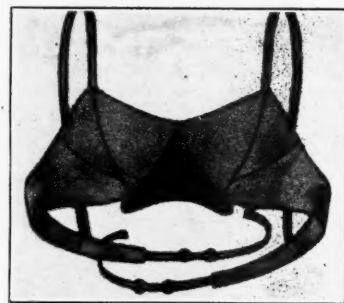


A-B-C Bath Mat

inlaid, in striking contrast. Since the color goes clear through, no fading takes place. The A-B-C mat is also washable. It is offered in three sizes: 14 by 27, 16 by 29, and 30 by 36 inches. A-B-C Tire & Rubber Co., 2649 Clybourn Ave., Chicago, Ill.

Le Soutien-Gorge — "Sylphide"

THE perfect breast support must be healthful and beautiful. In "Sylphide" the breast supports are cut scientifically to the needs of every movement of the figure and its molding. Each breast is held in three directions, from diaphragm, side waist, and shoulder. The molded dia-



"Sylphide"

phragm inset is of odorless washable rubber by the "Vital" patent process. It is finely engraved on the side worn to the skin, permitting comfort, with a reducing effect. It is beautifully reenforced, of a quality which will withstand even tropical climates. The design of the side and shoulder straps leaves the back bare.

The following fitting directions are important. Slip arms into shoulder straps, place bodice in position. Pass waist tapes around waist as low as possible. (They should pass under lowest ribs.) Attach buttons to rubber tapes; then loosen tapes, causing the least possible strain on the rubber. Do not wear too tightly.

"Sylphide" may be washed in the ordinary way. The doubled fabric should be well rinsed out, so that no soap remains in between. Repeated washing will do no harm nor hurt the rubber; only continued application with an overheated iron is harmful.

This garment comes in three sizes: small, medium, and large. Special models are made to order. It is also designed in four qualities: Bret-Net, white or flesh pink, for sports or summer wear; Jappa Silk, same colors, for everyday use; Crepe-de-chine, white, pink, or black, for day and evening; Lace-de-Luxe, white or black, for evening.

"Sylphide" is manufactured by Reliance

Rubberware, Ltd., Formosa St. and Amberley Rd., Paddington, London, W. 9, England, which seeks an American manufacturer to make the product.

Dirigible Balloon

IT was inevitable that aviation influence the toy industry. Many playthings were modeled after famous aeronautic achievements. The illustration shows a



"Los Angeles"

toy balloon that will capture the fancy of any child interested in balloons and airships. This is a reproduction of the well-known dirigible, *Los Angeles*, made of white rubber with the outlines of the details of the ship in blue. Before inflated, the balloon measures 15 inches in length. A rubber stopper at the tail-end prevents the air escaping. The Miller Rubber Co., Akron, O.

A New Sport Item

PROPER exercise, nowadays, is being extolled as one of the greatest benefits to health. No one realizes this more keenly than exponents of the manly art—boxing. One of its members, in consequence, has invented a substitute for shadow boxing, the "Shadow Ball."



The "Shadow Ball"

"Buffalo" Costello has met many men in the ring, and has prepared many for it. He has had, as a well-known athletic instructor, many experiences.

Some time ago, H. O. Costello completed his invention and he says that it is fine practice in footwork, as well as exercising the arms and training the eye.

The "Shadow Ball" is made with a heavy leatherette cover and a pure gum bladder inside. The ball is attached by means of a heavy elastic to the adjustable head band. When the ball is punched, the

same action is obtained as in both bag punching and shadow boxing. It not only affords keen sport, but is a great muscle and body builder. It comes in two models, one with a leatherette cover and the other with a sheepskin cover. The Moneco Co., New Haven, Conn.

For Sky Riders

"VISIONAIRE—the aviation goggle with ten points of superiority." Such is the claim made by the Continental Optical Co., Indianapolis, Ind., for this recent optical development for flyers, here illustrated. Included in the ten points are: all-weather corrosion-proof aluminum eye frames; adjustable ventilators; leather-covered, steel spring, universally adjusted, conforming head-band; hinge-action strengthening bar consisting of a series of ball and socket joints giving perfect



VisionAire Precision Goggles

flexibility to the mask and yet sufficient strength to take the entire strain from the sponge rubber and maintain perfect optical centers; deep curved ophthalmic lenses 99 m.m. wide with no lost center vision, which are interchangeable, ground to matched perfection or which can be ground with correction; and a soft comfortable sponge rubber mask designed to fit the contour of the face so as to distribute the pressure giving the greatest amount of comfort and providing a constant seal admitting no air or dust.

Novel Sponge Rubber Toys

PRACTICAL hand-made toys of sponge rubber are being imported from Germany. The rubber is delightfully soft and springy to the touch and is made up into all sorts of novelties such as soap dishes for the children's bath-tub, animals, etc. Some of the soap dishes have a little animal attached at one end, made of rubber of a contrasting color. The animals themselves are made by fastening together different pieces of sponge rubber shaped to form the different parts of the body—head, arms, and legs, as well as features. The soap dishes are cut out of the sponge rubber, and have high standing sides to keep the soap in place. One toy was a fascinating teddy bear which sat nonchalantly astride the edge of the bath tub, awaiting the arrival of some devoted child. Arnold, Constable & Co., Fifth Ave. at 40th St., New York, N. Y.

Ward Slipper

WHEN silence is essential, footsteps must be muffled. In the sick-room, and especially in a hospital, this new moleskin slipper with a double smoked

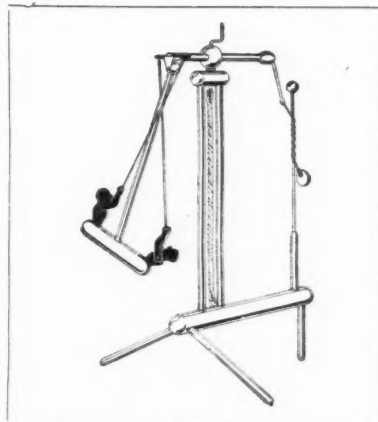


English Slipper

sheet sole will prove a convenience and a comfort. It is the last word in durability, and will not slip. It comes in three shades: fawn, brown, and black. It may be had in sizes two to seven for women, and six to ten for men. The Self-Controlled Air Cushion Co., Ltd., Clifton St., Newton Heath, Manchester, England.

New Toy with Rubber Motive Power

THE toys which children like best are those which they can twist and pull around, without breaking, of course. This childish fancy will be satisfied by the products of The Toy Tinkers, Inc., Evanston, Ill. A popular article, here illustrated, is Tinker Go-Round. It is based on an old principle, newly applied, resulting in a constructive and continually amusing toy. Several different motions, including rotary, reciprocal, and spiral, are in effect at one time. Tinker Go-Round runs ten minutes



Tinker Go-Round

with one winding. Pure gum rubber, readily replaceable, supplies the motive power. The remainder of the toy is made almost entirely of wood, nicely painted in many brilliant hues.

The Toy Tinkers, Inc., market also other toys manufactured in their characteristic, brightly colored, wooden designs, all with a flexible rubber backbone, easily replaced, that permits twisting the articles in several different novel shapes. Among these are included: Drag-on Tinker, Puppy Tinker, and Baby Doll Tinker.

Financial and Corporate News

The Firestone Tire & Rubber Co.

TO THE STOCKHOLDERS:

On behalf of the Board of Directors, I present herewith report for the fiscal year ended October 31, 1929.

In previous years our annual report included subsidiary companies in the United States only; this year we are including our foreign subsidiary companies.

Total sales of the parent and all subsidiary companies amounted to \$144,585,804, which is an increase of over 8 per cent. This percentage does not truly reflect the increase in business as the actual increase in unit sales was over 30 per cent.

Net profit for the year after providing for depreciation, interest, federal taxes, and all charges was \$7,726,870. After deducting dividends on preferred stock, the net profit applicable to the common stock outstanding during the year was \$16.35 per share or equivalent after the 400 per cent stock dividend to \$3.27 per share.

During the year your directors deemed it advisable to reconstruct the financial structure of your company in order to provide for the increased demand for our products and to extend the establishing of one-stop master service stores. Accordingly, in October we negotiated and sold 50,000 shares of common stock at \$260 per share and 600,000 shares of 6 per cent cumulative preferred stock, series A, par value \$100. The proceeds of these sales were used to retire the two issues of preferred stock then outstanding and to supply the company with additional working capital.

During the year the Firestone Battery Co. was organized to manufacture and distribute batteries, brake lining, and other auto accessories through our dealers and service stores and it has erected a factory at Akron for the manufacture of batteries. There has been such a demand for Firestone batteries from our dealers that it will be necessary to locate additional factories at favorable distributing points. We are now planning to build a factory on the Pacific Coast during the coming year.

A year ago we completed the equipping of our Los Angeles factory for a production of 7,500 tires per day, and have now found additional capacity necessary and have under construction a duplicate of this plant which will give us a total capacity of 15,000 tires per day at this factory.

Last year we completed the erection and equipping of a plant in Brentford, near London, England, with a capacity of 2,500 tires a day, and we are now erecting an addition to this plant to increase its capacity in order to take care of our foreign trade.

We are also adding to our Plant 2 at

Akron, O. When these additions are all completed and equipped, they will give us a capacity of 80,000 tires a day.

To facilitate further the acquiring of cotton at most advantageous markets, the Firestone Cotton Mills purchased a specially designed cotton warehouse with a capacity for storage of 100,000 bales of cotton. We have also increased our cotton fabric manufacturing facilities, which gives us a capacity of 45,000,000 pounds a year at a very low cost.

Our rubber washing and refining plant and warehouse in Singapore, with seven buying offices in outlying districts of the rubber-growing world, enable us to secure our rubber direct from the plantations to our factory.

We are making rapid progress in clearing the land and planting rubber in Liberia and will have planted over 50,000 acres at the end of the planting season in 1930. Each year gives us added assurance that we can produce rubber in Liberia at a lower cost than in any other rubber-growing country.

One of the problems in the past few years has been a more efficient and economical distribution of our product. Our policy of cooperating with our dealers in establishing one-stop master service stores is proving very successful as it gives the car owner a standard and economical service on tires, tubes, batteries, gasoline, oil, brake lining, rims, and other automobile accessories. There are now over 200 of these modern service stores in operation, widely distributed throughout the country, and we are planning to increase these in cooperation with our dealers as fast as conditions warrant. The success of these service stores has convinced us that the car owner appreciates this service, and we are sure our investment in them will prove very profitable to our dealers and to the company.

HARVEY S. FIRESTONE,
President.

Akron, O.
Dec. 3, 1929.

Firestone Tire on Exchange

Both the preferred and the common shares of the Firestone Tire & Rubber Co., Akron, O., were quoted on the New York Stock Exchange beginning December 5, instead of on the New York Curb Exchange, where both have been among the leaders for several years.

The transfer of the securities of the company from the Curb to the Stock Exchange follows the recent declaration of the 400 per cent stock dividend and the sale of the \$60,000,000 issue of new 6 per cent preferred stock. The listing approved by the Stock Exchange included 600,000 shares of the new preferred stock and 2,250,000 shares of the \$10 par value common stock of the company. The common stock is all there is outstanding at present of the 3,500,000 shares authorized. An additional 600,000 shares have been reserved for issuance upon exercise, from time to time, of stock purchase warrants which accompany the recent preferred issue of the company.

Raybestos-Manhattan, Inc.

TO OUR STOCKHOLDERS:

The results of operation of your company are summarized as follows for the first nine months of 1929:

Net Earnings

Net income, 1st 9 months, 1929..	\$3,108,919.81
Net income, 1st 9 months, 1928..	2,108,552.26
Increase in net income.....	1,000,367.55

Earnings per Share

Based upon 676,012 shares of common stock to be outstanding:

1st 9 months, 1929.....	\$4.60
1st 8 months, 1928.....	3.12
Increase	1.48

This statement includes the earnings of the predecessor companies, The Raybestos Co. and subsidiaries, The Manhattan Rubber Manufacturing Co., and United States Asbestos Co. and subsidiary, for the periods prior to September 16, 1929, and the combined earnings of all constituent companies of Raybestos-Manhattan, Inc., for the period subsequent to September 16, 1929.

The financial condition of your company at September 30, 1929, is extremely satisfactory, showing current assets of \$11,363,520.31 and current liabilities of only \$1,183,345.72, or a ratio of better than 9.6 to 1.

The cash funds of the company, including investments in municipal bonds, amount to \$3,769,029.17, and you will note are more

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.....	Pfd.	\$2.00 q.	Jan. 2	.....
Endicott Johnson Corp.....	Com.	\$1.25 q.	Jan. 1	Dec. 18
Endicott Johnson Corp.....	Pfd.	\$1.75 q.	Jan. 1	Dec. 18
Firestone Tire & Rubber Co.....	Com.	\$0.40 new, in., q.	Jan. 20	Jan. 5
Garlock Packing Co.....	Com.	\$0.30 q.	Jan. 2	Dec. 14
General Tire & Rubber Co.....	Pfd.	1 1/2 % q.	Dec. 31	Dec. 20
General Tire & Rubber Co.....	Pfd.	\$2.00 ex.	Jan. 7	Dec. 20
Goodyear Tire & Rubber Co.....	Com.	\$1.25 q.	Feb. 1	Dec. 31
Goodyear Tire & Rubber Co. (Cal.).....	Pfd.	\$1.75 q.	Jan. 2	Dec. 19
Goodyear Tire & Rubber Co. (Can.).....	Pfd.	\$1.75 q.	Jan. 2	Dec. 14
Johns-Manville, Inc.....	Com.	\$0.75 q.	Jan. 16	Dec. 26
Johns-Manville, Inc.....	Pfd.	\$1.75 q.	Jan. 2	Dec. 12
Mohawk Rubber Co.....	Pfd.	\$1.75 q.	Jan. 2	Dec. 27
Rex-Hide Rubber Manufacturing Co.....	Com.	\$0.25 s. a.	Jan. 15	Dec. 31
Rex-Hide Rubber Manufacturing Co.....	Com.	\$0.25 ex.	Jan. 15	Dec. 31
Seiberling Rubber Co.....	Pfd.	\$2.00 q.	Jan. 2	Dec. 20

than sufficient to take care of all outstanding liabilities.

There are no bank loans, bonds, or preferred stock outstanding, and the balance sheet shows total combined assets of \$20,276,537.06, with liabilities and reserves of only \$2,141,379.07, or a net worth of \$18,135,157.99.

A. F. TOWNSEND,
Chairman of the Board.
SUMNER SIMPSON,
President.

Passaic, N. J.
Nov. 15, 1929.

Goodyear's Rockmart, Ga., Mill Starts Production

Goodyear's new cotton mill at Rockmart, Ga., has been placed in production, it was announced recently by P. W. Litchfield, president of The Goodyear Tire & Rubber Co., Akron, O. Installation of machinery was finished before the end of the year, and by January 15 capacity production from the mill's 50,000 spindles is expected.

Formal opening of the Rockmart mill was scheduled for December 12 with city, state, and Goodyear officials in attendance. Included in these were Vice President C. C. Slusser and S. A. Steere, of the Akron plant, Governor Hardman, of Georgia, Mayor Munday, of Rockmart, and Mayor Ragsdale, of Atlanta. In the evening a dance and open house in one of the larger rooms of the mill followed a barbecue supper.

Opening of the Rockmart plant gives Goodyear three cotton mills in the south, others being located at Cedartown and Cartersville. Ground was broken for the Rockmart factory early in 1929.

In addition to the 1929 expansions in its southern cotton mills, Goodyear also erected a 5,000 a day tire factory at Gadsden, Ala., and a large rubber reclaiming plant. An airship dock was built on the Gadsden property and is now in use for winter operations of Goodyear blimps.

Goodyear is providing for the comfort of its workers at the new Rockmart operations by building 300 houses with modern conveniences. About 75 per cent have been completed.

VIEWS OF THE PRESIDENT AND RUBBER EXECUTIVES ON INDUSTRY

Devoted to a wide range of national and international subjects and making recommendations for legislation concerning many of them, President Herbert Hoover, in his message read at the opening of the second session of the Seventy-first Congress on December 4, expressed the conviction that confidence has been reestablished, that a very large degree of industrial unemployment and suffering has been prevented by measures taken by voluntary cooperation between the Government and business institutions.

"The measures taken must be vigorously pursued until normal conditions are restored," he told Congress.

In accordance with the Chief Executive's policy and at his suggestion approximately four hundred business executives, the selected spokesmen of important industrial and trade groups, met in Washington on December 5, 1929, to consider means for maintaining the national business momentum.

F. A. Seiberling, president of the Seiberling Rubber Co., Akron, O., and of the Rubber Manufacturers Association, Inc., was the rubber industry's representative on the group of sixty industrial leaders to oversee organization of a permanent national business clinic as the first direct result of President Hoover's conference. Paul W. Litchfield, president of The Goodyear Tire & Rubber Co., Akron, also attended the conference.

The following summarizes Mr. Seiberling's report to the National Business Survey Conference:

We have come through practically a normal year and have not been affected by the stock market collapse. We have had troubles of our own. One of them, an intense competitive zeal, influenced our business, and caused us in the early part of 1929 to make more products than we could sell, resulting, on July first, in the largest inventory ever known in the industry. The effect has been to make our business subnormal, for that inventory had to be absorbed.

That work has been about completed, and commencing in January, I feel that our business is going to go along, steadily,

normally; we are going to employ more people, pay more wages, and do a better business than in 1929.

James D. Tew, president of the B. F. Goodrich Rubber Co., Akron, O., considers the industrial outlook for 1930 very promising. He believes the recent recession has run its course, and sees no reason for curtailing expansion programs planned by Goodrich for next year.

"Forecasts for 1930 indicate that the volume of business done should exceed that of 1929," Mr. Tew said. "... the decrease in tire volume applicable to new cars should be more than offset by the increase in sales for replacement use ...

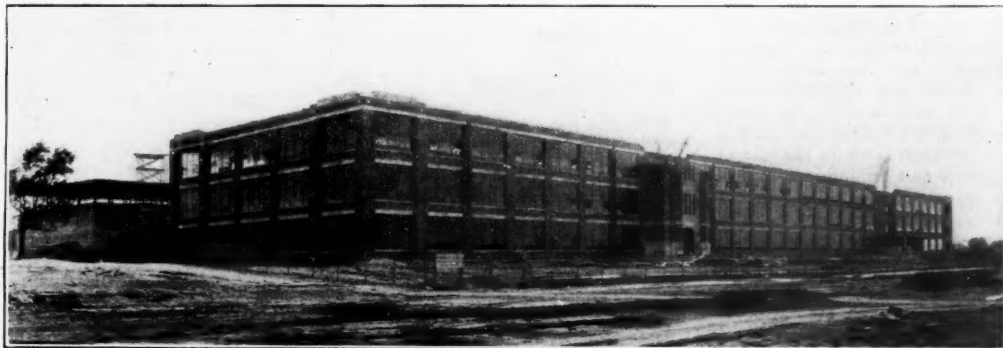
With the program for expansions announced by railroads and other industries, we are looking toward a substantial volume of business in hose, belting, packing, and other mechanical rubber goods. The rubber footwear business is largely dependent upon weather conditions, and from all indications we should have in the winter of 1929 and 1930 ample opportunities to dispose of large quantities of waterproof rubber footwear."

Wm. O'Neil, president of the General Tire & Rubber Co., Akron, has issued the following, covering his views of the prospect for business in the rubber industry for 1930:

"The business which our dealers did in November was considerably ahead of that in November, 1928. This is a pretty good indication of the way business is bound to be next year, as it came after the stock crash in October. ...

"Furthermore, additional financing of factory-owned stores will be increasingly difficult. Present stores, with high operating costs, will be obliged to raise their prices. This will have a tendency to stabilize business and give confidence to the regularly established dealer.

"Tires are now selling at a very low level. Any movement can naturally be expected to be upward. Prices based on a commodity which is selling below the cost of production, such as crude rubber, are bound to correct themselves. So, we can look for a sales gain based upon an increased selling price of the product."



The Goodyear Tire & Rubber Co.'s Cotton Mill at Rockmart, Ga.

The Rubber Industry in America

OHIO

Binney & Smith Co., 41 E. 42nd St., New York, N. Y., has announced the opening of a new office in Akron, O., on December 1. It is located at 515 United Bldg., corner of Main and Market Sts., and is under the management of Enos H. Baker. At one time he was associated with the Rex-Hide Rubber Mfg. Co., and more recently with the Portsmouth Chemical Co. Binney & Smith's Cleveland, O., office will be continued, also under Mr. Baker's direction.

The Republic Rubber Co., Youngstown, O., has announced the appointment of Curtis E. Wagner, for the last fifteen years export manager of The Miller Rubber Co., Akron, O., as foreign



C. E. Wagner

sales manager with headquarters at 794 N. Main St., Akron. Mr. Wagner recently returned from an eight-months' trip through seventeen European countries, calling on established distributors and arranging for new connections. He is one of the best-known expert executives in America, his linguistic and merchandising abilities having placed him in an advantageous position.

In collaboration with the executives of The Republic Rubber Co., Mr. Wagner has established a new and unusual export sales policy for Republic's distributors. It is written with the viewpoint of inspiring the distributors abroad with the utmost confidence in the manufacturer's ability and willingness to extend to his representatives such support and sales helps as are necessary to meet present-day merchandising conditions.

Ward Hudson Parry, treasurer of the Franz Foundry & Machine Co., Akron, O., has written a novel, "These Three," about a country doctor and the World War.

Seiberling Rubber Co., Akron, O., held an annual meeting of stockholders on

December 16, at which the entire board of directors was elected for the ensuing year. The directors are: F. A. Seiberling, president, C. W. Seiberling, W. L. Wolfe, H. L. Post, Milton W. Harrison, B. O. Etling, George T. Bishop, and W. A. M. Vaughn. President Seiberling reported the activities of the company during the fiscal year ended October 31. Other routine matters were discussed.

The Giant Tire & Rubber Co., Findlay, O., has appointed James J. Fishburn director of sales. F. C. Burke, secretary of the company, who held the position of director of sales for several years, will continue in the sales department as manager of promotion.

A new tire which has been in the process of development for many months will soon be announced by the Giant company, and a vigorous and expanded program for 1930 will be outlined, it is reported.

The Palmer Gas Products Corp., manufacturer of carbon black, with headquarters in Shreveport, La., has its Akron, O., office in the Ohio Building, in charge of J. W. Herron, vice president.

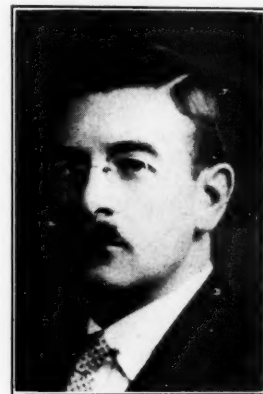
Taiji Komuro, managing director of the Yokohama Rubber Co., a subsidiary of The B. F. Goodrich Co., Akron, O., was a recent visitor in Akron, where he studied engineering plans, etc. While here, he expressed his opinion that the United States is industrially and economically sound. Upon his return to Japan he will carry out an expansion program at the plant of Yokohama Rubber Co., in accordance with the practice and theory he encountered at Akron.

Utility Manufacturing Co., Cudahy, Wis., has its Akron, O., service department located at 633 E. Exchange St., in charge of Walter Scheffer.

O. S. Hart, cashier of the Seiberling Rubber Co., Akron, O., since its organi-

zation eight years ago, has announced his retirement from active business, effective on January 1. He is 68 years of age. He has been in the rubber business more than twenty-five years, twelve years with the Diamond Rubber Co., six years with The Goodyear Tire & Rubber Co., both of Akron, and the remainder with Seiberling. His hobby is stamp-collecting, and about ten years ago he organized the Rubber City Stamp Club.

Allan Speedy, director of Binney & Smith & Ashby, Ltd., 17-19 Cannon St. House, 110 Cannon St., London, E. C. 4, returned to England in January after a brief stay in the United States where he inspected the carbon black plants,



Allan Speedy

sulphur refineries, and accelerator manufacturing plants of the companies with which his firm is connected.

Mr. Speedy also visited rubber manufacturing plants in Akron and other centers. His firm is the sole representative in the United Kingdom for Binney & Smith's Micronex gas black, and Stearex; Tire and Tube brands of sulphur manufactured by Stauffer Chemical Co. It handles also the line of accelerators produced by the Monsanto Chemical Co.

The Akron Rubber Reclaiming Co., Barberton, O., reelected the following officers for the new year: J. B. Huber, president; William Welch, vice president and general manager; J. M. Alderfer, second vice president; and R. J. Houston, secretary-treasurer. All except Mr. Houston, were reelected directors, together with Allen F. Ayres, Albert R. Henry, R. M. Pillmore, and C. W. Seiberling. Arnold H. Smith, a former director who has gone to England, was not included in the directorate. Business for the fiscal year was

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

- | NUMBER | INQUIRY |
|--------|--|
| 1260 | Manufacturer of machines for trimming sponge rubber. |
| 1261 | Manufacturer of "Sonora" hot water bottles. |
| 1262 | Manufacturer of the Walton puncture-proof tire. |
| 1263 | Manufacturer of rubber hand for displaying gloves. |

40 per cent higher than the preceding year. The company is financially sound and closed the year with a fair profit. The company operates its main plant at Barborton and a branch plant at St. Louis, Mo.

The Hood Rubber Co., Watertown, Mass., has leased a part of the De Weese Building on the south side of St. Clair Ave. N. W., Cleveland, O. The Hood wholesale business in tires, shoes, and other rubber articles will be conducted in this building for this section of the country.

L. A. Mayle, president and general manager of the Fremont Tool & Die Co., Akron, O., reports that his company is quite busy on rubber cutting dies and anticipates a heavy demand for the company's products during the winter.

C. R. Johnson joined the staff of the Philadelphia Rubber Works Co., Akron, O., on December 1, 1929, to engage in sales promotion work. Mr. Johnson was formerly technical director of Godfrey L. Cabot, Inc., Boston, Mass.

Goodrich Operations

Goodrich Silvertown, Inc.

Within the next few months service stations and tire stores in which The B. F. Goodrich Co., Akron, O., has financial interest will assume the identification of Goodrich Silvertown, Inc. Each unit will be one of a number of stores in this newly organized retail division of The B. F. Goodrich Co.

In an address before the First Ohio Management Conference at Columbus, O., recently, President James D. Tew outlined the purposes of the new retail division and the Goodrich policy toward independent tire dealers. He said that new facts about retailing and better service to motorists learned by a corps of experts in Goodrich Silvertown, Inc., will be made available to independent dealers to aid them in better merchandising.

"Goodrich Silvertown Incorporated stores are only set up where we are otherwise unable to obtain adequate retail representation. Where they are established, the manager in charge may be a good dealer—an excellent salesman—who has run into financial troubles solely because of his inability to operate the money end of the business. Or he may be a Goodrich dealer who has made excellent progress in a small way on a side street and we believe

that he can do a better job for us and for himself, if established on a main artery with drive-in facilities where he can make his aggressiveness, his selling ability, and his personality pay large dividends."

With less than one hundred stores, Goodrich Silvertown, Inc., units are comparatively few when considering the many thousands of tire dealers over the country. But they are located in various parts of the country which makes it possible for the retail organization to study the dealer problems in virtually every corner of the United States and to originate plans for better service and more economical retailing to motorists generally.

New Silver Fleet

Following closely on completion of the 30,000-mile tour of the 1929 Goodrich Silver Fleet comes the announcement from testing headquarters of the Goodrich company that an even larger Silver Fleet, of seventeen cars, is beginning the 1930 period of testing and demonstrating tires. This fleet will be broken into several squadrons, each operating in a different part of the country, to give tire engineers actual operating conditions in various parts of the country and to furnish data from which to determine the rate of wear under these different conditions.

A fleet of five cars including two big White trucks has been dispatched to Gainesville, Fla., for testing and demonstration on highways. Another division of the 1930 Fleet is operating in California and other western states of semi-tropical climate. One division will work from Akron headquarters. These cars are all painted the bright silver color of the 1929 Fleet, and the pilots wear the same snappy uniform.

Goodyear Activities

Paul W. Litchfield, president of The Goodyear Tire & Rubber Co., Akron, O., denied the report that his concern is considering a merger with the Seiberling and United States rubber companies. Mr. Litchfield, who was reached in Chicago, added that the proposal had never even been taken up with the Goodyear board.

Queried relative to the future production schedule of Goodyear, Vice-President C. C. Slusser, factory manager, said that Goodyear would return to a five and a half day week after the first of the year, starting January second. The inventory shutdown period of the factory was from 5 P. M. December 24 to 7 A. M. January 2.

No Need to Worry

The hearty pledges of support given to President Hoover in his plan to uphold general business will allay any misgivings as to the future of American trade. When sixty industrialists of the caliber of P. W. Litchfield and F. A. Seiberling, who had been called into council as leaders in the rubber industry, give assurance there would be no lag, the average man has no need to worry.

William P. MacCracken, former assistant secretary of commerce in charge of aviation, has accepted the post of special counsel for the Goodyear-Zeppelin Corp., Akron, O. He is expected to be in charge of Goodyear-Zeppelin's government contracts which now center around the building of the navy dirigibles in Akron. Mr. MacCracken will have offices at New York and Washington.

Pharis Expansions

Pharis Tire & Rubber Co., Newark, O., has just finished an expansion program approximating \$350,000. This includes erection of a new warehouse, capacity 100,000 tires, addition to the power plant, complete rebuilding of one factory building, and installation of considerable new manufacturing equipment. Included in this is a complete new molded tube department, equipped with the most modern labor saving equipment.

This company now has production facilities for approximately 5,300 tires and an equal number of molded tubes daily. In addition to the company's lines of Standard and Heavy Duty Roadgripper and Holdtite tires, it is now ready to market a new Fairway line, which is a competitive tire, and the new Pharis Triple Service Super 30,000-mile tire.

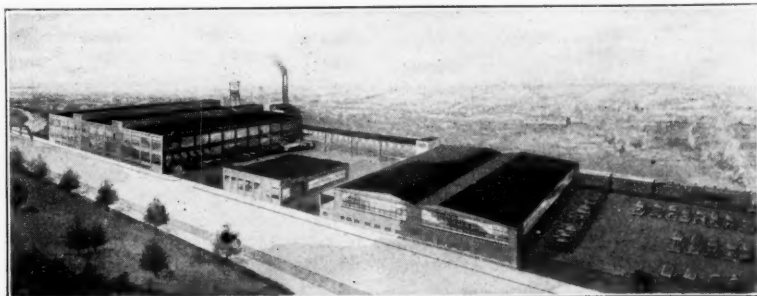
The Pharis company has received orders for tires and tubes from one of the largest retail distributors in the country, which amounts to upwards of \$3,500,000. Production on this order will start during the first week in January.

Carl Pharis is the founder and general manager of this company.

Adamson Machine Co.

Expands Market

The Adamson Machine Co., Akron, O., manufacturer of basic and special rubber machinery for the rubber industry, is bringing to a close one of the most successful years in its history, according to a recent announcement by Russell B. Koontz, president and general manager. Mr. Koontz is particularly elated with developments of the past few months which have enabled the company to place orders for equipment in Mexico, France, and Russia.



Pharis Tire & Rubber Co., Newark, O.

"The export end of our business looks quite favorable," says Mr. Koontz. "We have recently placed substantial quantities of basic rubber equipment in rubber factories in Mexico and France and at present are negotiating for the placing of additional equipment in Russian factories, of similar nature."

The Adamson company specializes in the manufacture of hydraulic presses, tubing machines, and basic and special equipment of all types.

Firestone Personnel

William R. Stuhler, of the research staff of the Firestone Tire & Rubber Co., Akron, O., and former secretary to Harvey S. Firestone, president of the company, will become associated with Batten, Barton, Durstine & Osborn, advertising agency, New York, N. Y., it was announced recently. His resignation from Firestone was effective December 16.

Mr. Stuhler will be in radio advertising work. For two years he was secretary to Mr. Firestone, but has not served in that capacity for the last two years. Recently he has been in research work at the Firestone plant, directing a staff of five men.

P. J. Prins, a member of the Firestone export division for the past year, sailed recently for Japan, where he will represent the company.

Anthony Wein, Firestone employe, has won the \$200 suggestion award offered by the company. This prize brings the total of suggestion board awards to \$500 for the October 9 and November 6 meetings. There were forty-five awards accepted. Mr. Wein's suggestion was for a little change in one of the details of an operation in the curing of wringer rolls.

At an annual meeting of Firestone stockholders held on December 16 two new members were elected to the board of directors. They are L. J. Jackson, general sales manager, and B. M. Robinson, assistant secretary. John W. Thomas was made general manager.

The Firestone tri-motored Ford plane, piloted by William M. McConnell and Edward J. Quigley and carrying four passengers, took off at the Akron municipal airport on a record breaking three-month tour on December 9. The plane headed for Indianapolis. Continuing on to Los Angeles, following a southern route because of inclement weather, the plane is to make a trip up and down the west coast and then back across the southern states to Miami, Fla., arriving there about January 10, when the Miami aviation meet opens.

One of the passengers, E. J. Bassine, as representative of the Firestone Battery Co., is to study conditions in the west coast cities with a view to the future location of a Firestone battery factory.

Harvey S. Firestone, Jr., returned last month from a European business trip well pleased with his company's foreign business. He looks for an improved condition for rubber sales abroad next year and said the company's English factory is operating at capacity and turning out 2,500 tires daily.

General Tire & Rubber Co.

New Trade Sales Manager

Announcement has been made by W. O'Neil, president of the General Tire & Rubber Co., Akron, O., of the appointment of L. A. McQueen as trade sales manager of the company. He has already assumed his new duties.



L. A. McQueen

Mr. McQueen has been connected with the rubber industry in Akron ever since his graduation with the degree of A.B. from the University of Wisconsin in 1916. He was born in Wisconsin in 1892.

He was one of four men recommended

by the president of the university to personnel men for one of the larger Akron rubber companies, who were scouting in the universities for new men. He was successively assistant advertising manager, advertising manager, and general manager of tire sales of The B. F. Goodrich Co., Akron, from which company he resigned in October, 1929.

He is a member of the University and Portage Country clubs, and plays golf, tennis, and bridge. He and Mrs. McQueen and one daughter live at 320 Devonshire Road, Akron.

President O'Neil's Views of the Service of Chain Stores

The chain-store system, as far as it applies to the sale of commodities that should be accompanied by service, has proved inadequate, Mr. O'Neil declared. He is attending a series of company sales conferences that will continue in various parts of the country until late in February.

He said that independent dealers, who can supply necessary service, are essential for the most successful merchandising of automobile tires.

"An automobile tire is a technical thing," he pointed out. "The local agent must have knowledge of engineering to do a real job. Varied conditions prevail over the country. The right sized tire must be sold. Wheels must be aligned. There are different types of tires for different service. A tire can be given too little or too much air pressure."

MIDWEST

The United States Rubber Co., evincing complete confidence in the industrial outlook, announced that under expansion plans already launched the output of the Detroit, Mich., tire plant is to be substantially increased in 1930 over the current year. The announcement was authorized by L. D. Tompkins, general manager of the tire department, to a group of press representatives who inspected the plant and the offices of the department, recently transferred from New York, N. Y.

Utilization of space now available in the plant and installation of new machinery and manufacturing methods will increase volume without need of greatly enlarging the floor area, it was stated.

Headquarters of the department are in the Morgan & Wright factory on East Jefferson Ave., near the Belle Isle Bridge, where 2,550,000 square feet of floor area—as much as in the larger automobile plants—are utilized. Twenty-five buildings comprise the factory unit, which fronts for 760 feet along Jefferson Ave., and extends back an average of 1,100 feet to the banks of the Detroit River.

The present program climaxes a story of constant expansion since Morgan & Wright, a subsidiary of the United States Rubber Co., moved here from Chicago, Ill., in 1906. At that time the unit was valued at \$1,500,000 as against \$25,000,000 today; floor area was 900,000 square feet as against 2,550,000; and the output was only 300 tires a day.

C. P. DeLore Co., St. Louis, Mo., manufacturer of barytes, according to A. J. Wetzel, secretary, is offering to the trade two new products. The company announces also that it has added more than 10,000 square feet of floor space to be equipped with special machinery designed and built by the company itself.

Monsanto Chemical Works, St. Louis, Mo., has announced that a contract has been let to the Westlake Construction Co., St. Louis, and building has been started on an addition to the Monsanto fine chemical plant in St. Louis, which with equipment will cost in excess of \$100,000. This is part of Monsanto's expansion program for 1929.

The Judsen Rubber Works, Inc., 4101 W. Kinzie St., Chicago, Ill., manufacturer of sponge and solid rubber products, reports a very satisfactory past year. The addition of large presses and mills has increased volume 75 per cent.

Carl A. Judsen, president, who founded the company in 1891, is calling on the company's Pacific Coast distributors. Other officers include Carl Judsen, Jr., vice president and works manager, and Leroy Goldstone, secretary and treasurer, in charge of sales.

Jas. V. Furman Co., broker and importer, 844 Rush St., Chicago, Ill., is western representative of the United Carbon Co., large producer of carbon black, with offices in the N. Y. Central Bldg., 230 Park Ave., New York, N. Y.

NEW JERSEY

The rubber situation in New Jersey has changed a little during the past month; some lines have fallen off. The production of mechanical rubber goods dropped, as was expected this season of the year. Little change occurred in the output of hard rubber goods. Automobile battery jars and radio parts kept some plants well occupied during the summer and the late fall. Orders for rubber shoes slightly declined. Manufacturers, however, are well pleased and are optimistic over the future. All expect very good business after the first of the year. Prices of tires remain the same, and the output is good.

The Rubber Manufacturers Association of New Jersey held its annual meeting at the Trenton Club, Trenton, N. J., on December 10 and reelected its old officers for the ensuing year. Those chosen were: president, A. Boyd Cornell, secretary and general manager, Hamilton Rubber Manufacturing Co.; vice president, I. Ely Reed, secretary, Mercer Rubber Co.; treasurer, Horace B. Tobin, president, Woven Steel Hose & Rubber Co.; secretary, Charles E. Stokes, vice president, Home Rubber Co. A. C. Viles, general manager of the Rubber Manufacturers' Association, Inc., spoke about the present rubber situation.

Whitehead Bros. Rubber Co., Trenton, N. J., is running normally in all departments, but with no night shifts.

Walter T. Scott, representative for the Lambertville Rubber Co., Lambertville, N. J., has returned from a successful business trip through the Midwest. The Lambertville concern is running full time, enjoying a prosperous business.

The Murray Rubber Co., Trenton, N. J., announces that the two-day strike by two hundred employees has been settled and the men have returned to their old jobs. The strike resulted from the importation of two dozen tire makers and labor supervisors from Akron, O. The Trenton workmen resented hiring outsiders as a menace to their jobs, and the whole force was prepared to walk out. A conference was held, and the plant officials agreed not to hire any more outside labor.

Alfred H. Brenham, vice president of the company and representative of Caldwell & Co., Nashville, Tenn., bankers who are financing the Murray chain stores, said that the strike was not held against the men. The Akron men were laid off. Mr. Brenham said they were taken on to cut costs and that the Murray firm wanted to study other manufacturers' methods. Efficiency engineers had been working in the plant to cut production costs.

The Michelin Tire Co., Milltown, N. J., through President J. Hauvette Michelin, announces arrangements for making the Milltown plant one of the world's finest. A tire-planning expert from Akron, O., has been active quite a while at the Michelin unit. The com-

pany now uses one shift so that the expansion program can be mapped. The concern recently acquired a large tract of land for erecting more buildings.

The chief engineer of Michelin's European factories came to the United States some time ago to develop the plans. He has just completed two new tire plants for Michelin: one at Stoke-on-Trent produces about one-third of the tires used in England; while the one at Turin turns out about 40 per cent of all tires used in Italy. Everything at the new Michelin plant will be done by machinery, saving time and doing away with all hand work. New and specially designed machinery, including new vulcanizers, will be installed.

The United States Rubber Co., 211 Passaic St., Passaic, N. J., has let a general contract to the Turner Construction Co. for a six-story factory 100 by 175 feet on Market St. It will cost \$400,000.

Miah Marcus, treasurer of the Puritan Rubber Co., Trenton, N. J., has been on a three weeks' business trip through Canada. He reports good business conditions. The Puritan company is running normally.

The Pierce-Roberts Rubber Co., Trenton, N. J., announces that business has fallen off a little and that the night shift has been discontinued. The day force is working full time.

The Laurel Co., Garfield, N. J., manufacturer of erasive rubber, plumbers' supplies, molded rubber goods, tubing, balls, and stationers' sundries, according to Arthur Dyer, is experiencing routine trade. However, 1929 was the best year the company has ever had.

A. H. Massey, general sales manager of the Combination Rubber Co., Trenton, N. J., has resigned to accept a more responsible position with the United States Rubber Co. Mr. Massey, formerly western representative for Combination for several years, was affiliated with the concern a long time. While in Trenton, he was successful in building up the company's business. The Combination company is filling the

position temporarily and will later name a sales manager.

William H. Sayen, Jr., president of the Mercer Rubber Co., Trenton, N. J., has been on an extended business trip to Chicago, Omaha, and other principal western cities. The Mercer company has considerable trade.

The Luzerne Rubber Co., Trenton, N. J., reports no change in the hard rubber business and that it has promises of many orders for late winter trade.

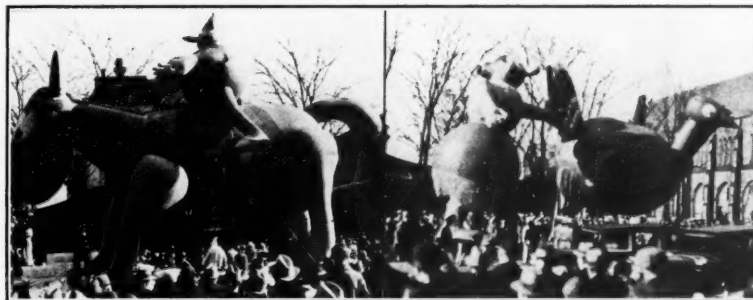
The Joseph Stokes Rubber Co., Trenton, N. J., states that business in the hard rubber industry remains normal and that the prospects for the new year are very good.

Robert J. Stokes, president of the Thermoid Company, Trenton, N. J., declares that business is generally good for this season of the year and that he expects conditions to improve at the beginning of the new year.

The Fidelity Industrial Corp., formerly the Fisk Flap Tube Rubber Co., Yardville, N. J., was sold on December 18 at sheriff's sale at Trenton, N. J., to satisfy a claim of nearly \$40,000 held by Michael Gilinsky and Hyman A. Rosenthal, both of Trenton, formerly owners of the rubber company. The purchase price was \$1,000. The new owners say they have no plans for disposing of the property. William J. Connor was appointed receiver of the company by Chancellor Walker, but the chancery court removed the property from the receiver's hands. A second mortgage of \$250,000 is on the property. Several years ago Gilinsky and Rosenthal, the latter president of the Near Para Rubber Co., sold the plant to the Fisk Flap Tube Rubber Co., which subsequently went out of business. Then the Fidelity corporation took it over.

S. A. E. Meetings

The annual dinner of the Society of Automotive Engineers will be held on January 9, 1930, at the Hotel Pennsylvania, New York, N. Y. The annual meeting will be held on January 20 to 24, 1930, at the Book-Cadillac Hotel, Detroit, Mich.



These are replicas of characters taken from the comics, made by The Goodyear Tire & Rubber Co., Akron, O., and inflated with helium gas, featured in the annual Thanksgiving Day parade down Broadway of the R. H. Macy Co., New York, N. Y. It was viewed by a crowd estimated at 2,000,000 people. They represent Spark Plug and its rider, Ma Katzenjammer pursuing the Thanksgiving turkey.

EASTERN AND SOUTHERN

Prosper E. Cholet, of Cholet-Vanderhoef, Inc., 171 Madison Ave., New York, N. Y., technical counselors, was formerly chief chemist for Michelin, first in France and then in the United States.

Ing. Folke Rosen, of Trelleborg Gummifabriks, A. B. Trelleborg, Sweden, has been in the United States on business for his firm.

General Atlas Chemical Co., 60 Wall St., New York, N. Y., has changed its name to the General Atlas Carbon Co. This was due to the fact that the General Chemical Co. had protested to the Secretary of the State of New York against the use of the name General Atlas Chemical Co., because it might confuse the public. This is the only change involved, personnel, policy, and product remaining exactly the same as before.

Gaston Moreau, administrateur délégué de la Société d'Exploitation des Etablissements Lick et des Brevets Paramount, Ivry-sur-Seine, France, was in the United States last month on business for his company, which is the largest manufacturer of rubber balls in France.

Dispersions Process, Inc., Oaks, Pa., has announced that after January 1, 1930, its offices will be located at 1790 Broadway, New York, N. Y., and its laboratory and manufacturing plant at Naugatuck, Conn. All communications should be addressed to the New York office. These changes will give the company an increased organization and additional laboratory and manufacturing facilities.

Sylvania Industrial Corp. is progressing rapidly with the construction of its plant at Fredericksburg, Va. This new company will manufacture transparent cellulose wrapping paper, known as Moisture-Proof Fenestra, and expects to be in full operation during the coming spring. H. H. Replogle is vice president.

The National Power Show

The Eighth National Exposition of Power and Mechanical Engineering was held at Grand Central Palace, New York, N. Y., December 2 to 7, 1929.

Four hundred and seventeen exhibitors displayed a comprehensive array of new inventions, power machinery, machines designed for special use, precision instruments, new alloys, heating plants, air conditioning, new tools, and other machine and power developments.

Special reference is here made to exhibits of particular interest for the rubber industry.

Barco Mfg. Co., 1801 Winnemac Ave., Chicago, Ill. Valves and joints.

Bristol Co., Waterbury, Conn., Industrial recording instruments, etc.

Carrier Engineering Co., 850 Frelinghuysen Ave., Newark, N. J. Air conditioning and manufactured weather.

Peerless Machine Co., Racine, Wis. High speed rubber cutters, etc.

C. J. Tagliabue Mfg. Co., 18 Thirty-third St., Brooklyn, N. Y. Industrial recording instruments, thermometers, and oil testing apparatus.

Taylor Instrument Companies, Rochester, N. Y. Industrial recording instruments, etc.

Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pa. Hydraulic valves and expansion pipe joints.

Carbon Black Export

Association Formed

Representatives of companies producing over 92 per cent of the world's output of carbon black have organized the Carbon Black Export Association, Inc., a Delaware corporation, to promote rapidly growing interests of American carbon black manufacturers in foreign markets.

Participants were Binney & Smith Co., representing Columbian Carbon Co., Coltex Corp., Keystone Carbon Co., and

Texas-Louisiana Carbon Black Co.; United Carbon Co. and subsidiaries; Kosmos Carbon Co., Eastern Carbon Black Co., and Crystal Carbon Co.; Godfrey L. Cabot, Inc., including Texas Elf Carbon Co., Cabot Co., Cabot Carbon Co., and Gas Products Co.; J. M. Huber, Inc., including J. M. Huber Co. of Louisiana, Inc., Ebony Carbon Co., Weston Carbon Co., and J. M. Huber Pigment Co.; The Palmer Gas Products Corp., representing the associated carbon black interests of The Palmer Corp. and Electric Bond & Share Co.; and R. W. Greeff & Co., Inc., for Texas Carbon Industries, Inc.

The officers of the association are Norman Lee Smith, Binney & Smith Co., president; Edmund Billings, Godfrey L. Cabot, Inc., vice-president; R. H. de Greeff, R. W. Greeff & Co., secretary; G. A. Williams, United Carbon Co., treasurer; H. W. Huber, J. M. Huber Co., assistant treasurer. They, together with John W. Herron, Palmer Gas Products Corp., constitute the board of directors.

NEW ENGLAND

Brockton Tool Co., manufacturer of heel molds, 103 Belmont St., Brockton, Mass., has announced that Herbert H. Wydom, formerly mold engineer with the Hood Rubber Co., Watertown, Mass., is now affiliated with the Brockton organization where he will be in charge of manufacturing mechanical goods and specialty molds of all descriptions. The Brockton company, through this addition, feels qualified to give even better service in this field.

The United States Rubber Co. footwear plants in Naugatuck, Conn., are experiencing increased business due to heavy storms and inclement weather gripping the country.

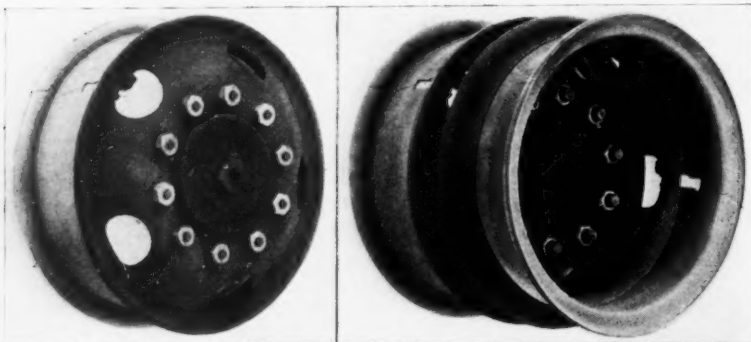
United Shoe Machinery Corp., Boston, Mass., announces that George Geddes has been promoted to district manager for the State of Maine.

Fisk Announcements

The Fisk Tire Co., Inc., Chicopee Falls, Mass., recently announced that the new Fisk Air-Flight principle automobile tires will be standard equipment on Chrysler and Dodge cars. Other automobile manufacturers are expected to complete arrangements to include Air-Flight tires as standard equipment within a few weeks, several negotiations at present being carried on, officials of the Fisk company said.

"Although it is only a few weeks since we first announced the new Fisk Air-Flight tires," said C. M. Piper, sales manager of Fisk, "we have received numerous orders from dealers, and reports from our divisional offices indicate that the tire has met with widespread recognition from the driving public."

The Fisk company, has also announced that it will maintain wages at the present levels in Chicopee Falls, Mass., Cudahy, Wis., and also in the textile plants at New Bedford, Mass., Pawtucket, R. I., and Jewett City, Conn.



Goodyear's type "K" rims for mounting large pneumatic bus and truck tires have been adopted as standard equipment on Budd Wheels. The single bevel mounting was developed to provide more satisfactory single and dual heavy duty tire equipment and has met favor. Growing popularity of pneumatic tires for heavy transportation brought the need for a simplified way to change tires. The "K" type rim is collapsible and by its use a casing can be removed easily and in short time. No special equipment is necessary for the operation, even though tires have become rusted fast to the rim through long service without change.

PACIFIC COAST

Goodyear-Zeppelin interests will co-operate actively in the operation of the airship line across the Pacific with important steamship, airplane, and banking concerns, according to P. W. Litchfield, head of the Goodyear International Co., Goodyear-Zeppelin Corp., and chairman of the board of Pacific Zeppelin Transport Co. While it has not yet been officially announced it is generally understood that the new trans-Pacific airship line will have Los Angeles as its American base. The building of ships will start immediately after the Goodyear-Zeppelin concern in Akron finishes the two immense airships ordered for the United States Navy.

The new members of the directorate are: R. Stanley Dollar, Dollar Steamship Co.; Harry Chandler, Los Angeles Steamship Co.; Col. E. A. Deeds, director, National City Bank, New York; F. B. Rentschler, president, United Aircraft & Transportation; G. B. Grosvenor, president, Aviation Corp.; Henry O'Melveny, lawyer, Los Angeles; K. R. Kingsbury, president, Standard Oil Co. of California; W. P. Roth, Matson Navigation Co.; Herbert Fleischacker, president, Anglo-London-Paris Bank, San Francisco; Clarence H. Cooke, Bank of Hawaii, Honolulu; John B. Galt, Hawaiian Trust Co., Honolulu; and Walter Dillingham, Honolulu. New York directors chosen on October 28 were: J. R. Ripley, National City Co.; Allan Lehmann and Roland Palmedo, of Lehmann Bros.; E. O. McDonnell, of the Grayson M. P. Murphy Co.

American Rubber Mfg. Co., San Francisco, Calif., has, according to Col. J. L. Dodge, treasurer, experienced no let up; in fact, business for 1929 will very likely show a noticeable increase over 1928. The Oakland factory is busy turning out paper-makers' rolls, conveyor belting for mines, cement mills, and gold-dredges, oil suction, discharge hose, and mechanicals.

Seiberling Rubber Co., Akron, O., will, it is stated on good authority, build a branch factory on the Coast, to be located either in Oakland or in Los Angeles. The company has, the Oakland Chamber of Commerce states, bought and paid for a site of 100 acres on Jones Ave., East Oakland. Los Angeles interests, however, have not been indifferent to such a prospect and they feel confident of persuading the Seiberling concern to locate in the southwest city. Seiberling representatives state that their company is not yet prepared to make any announcement.

Quaker City Rubber Co., Philadelphia, Pa., had a very gratifying increase in business in the far west territory during 1929, according to Pacific Coast Manager J. T. Moore, who is stationed at 168-170 Second St., San Francisco, Calif. There was much demand for black and white top canners' belting in

various thicknesses, heavy hose, packings, and sundry mechanicals. The branch, which was established five years ago, carries an exceptionally heavy and varied stock to meet short orders.

Pioneer Rubber Mills, 345-353 Sacramento St., San Francisco, Calif., according to Manager of Industrial Sales Wm. R. Goudie, is operating at utmost capacity on a large line of staple products. Mr. Goudie, who has had a long experience in marketing mechanical rubber goods in the Far West, now makes his headquarters at the San Francisco address.

Chanslor & Lyon Stores, Inc., according to Assistant General Manager T. A. Walsh at the San Francisco headquarters, 730 Polk St., has not completed negotiations for the sale of the company's tire factory in Oakland, which was started many years ago by the Sturges company. The C. & L. concern ceased making tires with that brand last spring, when it took over distribution of the Badger line.

Dayton Rubber Co., Dayton, O., is confidently expected to set up a tire factory in Los Angeles in the near future. The Chamber of Commerce has made attractive overtures to the company, but thus far has not got a definite reply. Dayton executives are planning to visit Los Angeles for the purpose of looking over possible sites.

Boston Woven Hose & Rubber Co., which has scored a notable increase in sales of late in the coast field is represented there by the J. B. Lippincott Co., Sheldon Building, San Francisco, Calif. Branches are maintained at Seattle, Wash., covering British Columbia and the states of Washington and

December 23 to ratify the proposal to increase the authorized issue of 20,000 shares of 7 per cent cumulative preferred stock at \$10 par to 100,000 shares. Although the existing preferred stock is nonconvertible, the additional 80,000 shares are to be convertible at the option of the holder on the basis of one share of common stock for each two shares of the convertible preferred. The preferred is to be redeemable on payment of a premium of 5 per cent at par value plus an amount equal to all accrued dividends. President A. Schleicher explained that this action was requisite for carrying out the second phase of the financial program already planned.

The first phase was to finance, construct, and equip an efficient low-cost modern factory with a capacity of 6,000 tires and 10,000 tubes a day. This has been satisfactorily accomplished. The second phase will provide additional working capital for the increased volume of business already attained. Prospects for the ensuing year are very encouraging, President Schleicher states.

India Tire & Rubber Co. will be represented in Los Angeles, Calif., by the India Tire Co., Ltd., the president and sales manager of which will be F. L. "Pat" Ryan, who two years ago was promoted from coast manager of the parent company, stationed at San Francisco, Calif., to general sales manager of the company at Akron, O. President W. G. Klauss and Treasurer Walter Vich, of the Akron company, assisted in organizing the new distributing concern while visiting Los Angeles. Dean Mosher, who was in charge of the local store of the concern hitherto distributing India tires, is vice president and general manager of the new India organization. The latter will have temporary quarters at 1201 S. Olive St., but after March 1 expects to be in a new building of its own on Flower St. near Pico. It will have capacity for ten carloads of tires and have a drive-in service.

Firestone Tire & Rubber Co. of California has quite completed the extensions made on its Los Angeles factory, which with the equipment will represent an additional investment of \$3,000,000 to the \$7,000,000 put in the original plant. The equipment for the new sections will be in place by February 1, and operation started soon afterward. Some of the features of the new buildings will be specially hardened cement floors to withstand the heavy trucking and woodblock flooring where tire building, tube handling, and various assembling operations will be carried on. The equipment will include several heavy internal mixers (Banburys) and numerous single tire vulcanizers to supplement the regular hydraulic vulcanizers. The Xylos Rubber Co. plant on the Firestone grounds is working near capacity, turning out an average of 50,000 pounds of assorted types of reclaim daily.



J. B. Lippincott

Oregon; Los Angeles, covering southern California; and El Paso, covering that city and New Mexico and Arizona. Mr. Lippincott states that during a recent trip covering this territory he found commercial conditions in a very healthy state.

Samson Tire & Rubber Corp., Los Angeles, Calif., held a stockholders' meeting at its New York office, N. Y.,

The Firestone concern had an excellent year, having scored a good net profit, and the prospects for 1930 are very reassuring. It manufactures directly for the eleven far west states and the Hawaiian Islands, and ships as well to many overseas ports. Sales Manager R. C. Tucker returned in mid-December from a trip through the western field during which he conferred with branch managers in the leading cities about starting the most aggressive selling campaign in the company's history. The company will open a \$250,000 branch and one-stop station in Seattle on January 14, and a \$150,000 warehouse and station in Phoenix, Ariz., a few weeks later.

The Firestone company has announced the appointment of A. J. Redmond, former truck and bus sales manager, as branch manager in Portland, succeeding F. A. Yeamans; C. W. Wood, formerly acting manager at San Francisco, as branch manager at Denver; and of C. A. Tierney, formerly with Barker Bros., Los Angeles, as manager of a new merchandising department at the Firestone factory.

Pacific Goodrich Rubber Co., Los Angeles, will, according to vice president Samuel B. Robertson, shortly award contracts for some \$500,000 worth of building extensions and new equipment to provide for the steadily increasing demand for greater production facilities. The executives of the company are much pleased with the headway made during 1929, and say that the outlook for 1930 is decidedly cheerful. While no definite figures are yet available, it is estimated that the past year's business will total close to \$13,000,000. General Sales Manager Frank E. Titus recently returned from a trip during which he conferred with the managers of the company's chief branches on the coast regarding distribution in 1930.

United States Rubber Co. has been awarded two important tire contracts after a rigid investigation of service records made with its products and those of several competitors throughout the country. Union Pacific Stages, Inc., made its third annual contract for all tires required on the many busses of its extensive system, and the Oregon State Board of Control contracted for all tires needed for the numerous motor vehicles owned and operated by the state.

Harry Corbett has joined The Dayton Rubber Mfg. Co., Akron O., as a special factory representative. Mr. Corbett has been in the tire business since 1911 and still operates his own Master Service Station in Los Angeles, Calif., featuring Dayton Thorobreds. Mr. Corbett has played a prominent part in tire merchandising activities for many years—having held executive positions with both India and Mohawk—and has a national acquaintance.

Goodyear Tire & Rubber Co. of California at Los Angeles reports production and distribution well above the

seasonal average, with all departments operating on full time. A recent visitor to the factory was Harry E. Blythe, formerly a local executive, and now assistant to the president of the parent Goodyear company in Akron. Christmas greetings to dealers were contained in miniature tires and containers that were dropped from the company's airship "Volunteer" at their business places.

Jack B. Hassett, long Los Angeles branch manager for Dayton, has been made general manager of the Dayton Rubber Co. of California, distributors, and also coast representative for the Dayton Rubber Co., Dayton, O. Gus Owens, long service manager at the Dayton branch, Vine St., San Francisco, has been promoted to manager-ship.

Allbestos Corp., Philadelphia, Pa., will be represented in the Northwest by J. Webb Kitchen, brother of W. G. Kitchen, president of the company. His headquarters will be at 2115 Second Ave., Seattle, Wash., and he will specialize in brake lining.

The Thomas Tire Service, Inc., Wenatchee, Wash., was recently opened. The building was built at a cost of \$80,000 by the Firestone interests.

Utility Manufacturing Co., Cudahy, Wis., manufacturer of labor saving machinery for the rubber trade, is represented on the Pacific Coast by Lombard J. Smith Co., 324 N. San Pedro St., Los Angeles, Calif.

Manager, United States

Los Angeles Tire Sales

To have been attached solely to one great rubber manufacturing company since he entered business and to have acquired an exceptionally intimate knowl-



Chester W. Ort

edge of selling conditions and close business friendships in nearly every city and town in the Pacific Coast and several inland states is the enviable record of Chester Walton Ort, manager of tire sales for the United States Rubber Co. in the metropolitan area of Los Angeles.

Mr. Ort was born in Centralia, Wash., in 1890, and after attending the local grammar and high school, spent three

years at the University of Washington, Seattle, where he specialized in engineering. His first business experience began with the United States Rubber Co. in Seattle on October 15, 1913, and with that branch he became adept in selling all lines carried by the company. He was promoted on April 1, 1922, to the management of the footwear department of the company at the San Francisco branch. On January 1, 1926, he was made branch manager at Salt Lake City; on September 1, 1927, branch manager at Spokane; on April 15, 1929, branch manager at Portland; and on August 1, 1929, appointed to his present position in Los Angeles.

Mr. Ort's fraternal connections include Delta Tau Delta college organization, Rotary clubs of Spokane and Portland, Sales Managers' Association of Spokane, Manito Golf Club of Spokane, and Portland Golf Club. His business address is 784 S. San Pedro St., Los Angeles, Calif.

Goodrich Footwear

Factory for Coast

Vice President T. G. Graham of The B. F. Goodrich Co., Akron, O., on a recent visit to the Pacific Goodrich Rubber Co. plant in Los Angeles, Calif., stated that about \$250,000 will be spent early in 1930 for additional manufacturing and warehouse facilities at the coast plant, and that the Goodrich company will transfer much of its rubber footwear business to Los Angeles and make the latter a distributing center for the lately acquired Hood lines. While Mr. Graham was unprepared to make a more specific announcement, his remarks were taken by the trade generally as indicating that Goodrich will very soon be pioneering in rubber footwear making in the Far West field, and that as business warrants it, the appropriation for expansion in that line will be steadily increased.

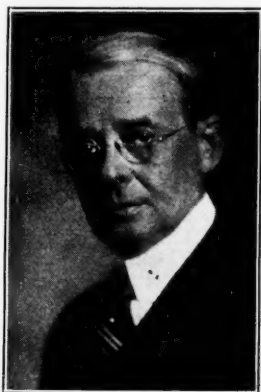
At the formal opening on May 2, 1928, of the plant of the Pacific Goodrich Rubber Co. James D. Tew, president of the latter as well as the parent company, stated that while tire making would be the major and immediate activity of the coast concern, he also intimated that it might not be long before the Los Angeles plant would also be making footwear and perhaps other products. The 46-acre plant is well suited for taking on a considerable footwear line, and power could be amplified and requisite machinery installed, it is said, in a very short time. The merchandising of the products would extend over not only the coast field of eleven states but also a wide trans-Pacific area.

Tire production at the Los Angeles plant in 1930 will be in excess of 1,500,000, with a payroll of \$2,500,000, according to Mr. Graham. He also estimates the tire replacement demand in 1930 for the United States at between 52,000,000 and 54,000,000, while original tire equipment will require between 23,000,000 and 24,000,000, a moderate increase over the 1929 output, but quite warranted, Mr. Graham says, by the healthy state of business which he has found everywhere in a nation-wide tour. He also states that a Goodrich plant will be opened next May in Yokohama.

Obituary

Noted Reclaimer Dies After Automobile Crash

THE rubber manufacturing industry sustained a severe loss and a host of friends were saddened in the passing of John S. Lowman, president of the Philadelphia Rubber Works, Inc., Akron, O., after six days of suffering from injuries received in a tragic automobile accident. Mr. and Mrs. Lowman had left their home in Hudson, O., on Tuesday morning, December 3, to drive to Akron, Mr. Lowman being at the wheel. In trying to avoid a collision with a skidding passenger bus, Mr. Lowman turned sharply to the



John S. Lowman

right. The heavy sedan got out of control, passed over a sidewalk, missed a guard rail, and tumbled 100 feet down a ravine. Mrs. Lowman was thrown through the top of the car, but escaped serious injury. Mr. Lowman, caught in the car, was so severely hurt internally that despite the best possible treatment at St. Thomas Hospital, Akron, he died on Monday, December 9.

Mr. Lowman was born in Cleveland, O., on December 18, 1874, and was educated at the city high school. He first engaged in business with the McIntosh, Huntington Co., Cleveland, in January, 1893. In July, 1897, he was attracted to Alaska and stayed in the Klondike country until September, 1899, when, leaving gold for rubber, he took a position with The B. F. Goodrich Co., Akron. In nearly five years with that concern he became so familiar with rubber makers' requirements that he readily qualified on June 1, 1904, for the secretaryship of the newly formed Alkali Rubber Co. When on January 1, 1910, that company was merged into the Philadelphia Rubber Works Co., Inc., Mr. Lowman was elected vice president and director in what has since become the largest independent reclaiming plant in the Akron district.

In appreciation of his expertness in production and marketing, Mr. Lowman was promoted from the management of the Akron office to that of the company in New York, N. Y., in June, 1914. Soon afterward he was placed in charge of the

rapidly expanding plant in Akron. Early in 1926 he took active charge of the building of a huge factory at Oaks, Pa., to handle the company's eastern business, and scarcely a year later directed the doubling of the latter plant's capacity. On January 21, 1929, he was chosen president. When the Rubber Reclaimers' Association, Inc., was organized in New York on June 25, 1929, Mr. Lowman was elected secretary and treasurer and a member of the executive committee.

Mr. Lowman was a member of the Portage Country Club, Akron City Club, Rotary Club, Akron Chamber of Commerce, and of Masonic orders. He had also been long an active member of the Rubber Manufacturers' Association, Inc.

Funeral services were held on December 12 at the residence in Hudson with his business associates as active and honorary pallbearers. Rev. J. Keeney McDowell, pastor of the Hudson Episcopal church, of which Mr. Lowman was a member, officiated, and burial was at Markille Cemetery in Hudson.

Active pallbearers were D. A. Metzler, Harry MacKusick, H. G. Day, and G. F. Lane, of the Philadelphia Rubber Co.; J. D. Tew, president of the B. F. Goodrich Co.; and Harry Williams, president of the First-City Trust and Savings Bank. Honorary pallbearers included J. K. Mitchell, Frank Van Cleef, Dr. H. J. Herrick, E. C. Shaw, Charles B. Akers, J. Ed Good, Harry Andress, George W. Billow.

Retired Rubber Veteran

A DANGEROUS curve, an overturned automobile, and another valuable associate was lost to the rubber industry. In an accident which seriously injured his wife and her friend, but from which the chauffeur escaped uninjured, William W. Weitling was killed on December 15 on the road to Fort Meade, Fla.

Mr. Weitling was born in New York, N. Y., on November 7, 1855, and educated in private and public schools there. He entered the employ of the India Rubber Comb Co., College Point, L. I., N. Y., on December 20, 1869, advancing through various clerical positions to department head, and becoming director and secretary in 1887. He held these offices until the company was taken over by the newly formed American Hard Rubber Co., New York, in 1898. He was made director and treasurer of the new organization, and later also vice president, which position he held for many years. At the time of his death he still was a director, although he had retired from activity, having also been chairman of the board. He served too as director and vice president of the Pequonoc Rubber Co., Butler, N. J., besides acting as president of the College Point Savings Bank.

He was one of the wealthiest and best-known citizens of College Point, prominent

as a business man and philanthropist. He was a member of the American Museum of Natural History and other learned organizations, honorary regent of the Lincoln Memorial Endowment, and president of the Conrad Poppenhusen Association. During his lifetime he had invented several hard rubber specialties and a machine for making hard rubber battery cells.

Services were at Crematorium, North Bergen, N. J., on December 20. Interment took place at Washingtonville, N. Y.

Prominent Executive

AS a New York Central Railroad train sped from Cleveland to New York, so sped the life of one of its passengers. Heart disease claimed another victim in Edward A. Andersen, president and gen-



Edward A. Andersen

eral manager of the Rubber Regenerating Co., Naugatuck, Conn., Mishawaka, Ind., Montreal, Canada, and Manchester, England.

Mr. Andersen was born in Chicago, Ill., on July 14, 1872, but had lived in Naugatuck since 1913. He began his successful career as a mill man with the regenerating company on March 1, 1900, in its old Chicago plant. From foreman he advanced to assistant superintendent, then superintendent of the factory at Mishawaka. On July 1, 1915, he was made vice president and assistant general manager of the Rubber Regenerating Co. Exactly four years later he was appointed president and general manager. Mr. Andersen was recognized as one of the best reclaimers in the country, as well as a capable organizer and efficient executive.

He is survived by his widow, two sons, and a daughter. Funeral services were held in Naugatuck on December 23.

The body was placed in the Tuttle Memorial Vault, and will be interred in Grove Cemetery in the spring. The honorary pallbearers were F. F. Schaffer, C. T. McCarthy, Walter H. Norton, Emil Mannweiler, George M. Rumney, Elmer Roberts, Atty. Clayton L. Klein, and A. J. McCullom. The active bearers were Thomas F. Dunning, Edward Reilly, Edward C. Lingenheld, J. C. W. Baker, Lester Gunn, and Eric C. Kerner. The committal service, held in the Tuttle Memorial Chapel, was conducted by Rev. Edward R. Hance.

Swinehart Executive

MONOXIDE gas poisoning has claimed another victim. This time it is Charles O. Baughman, secretary and treasurer of the Swinehart Tire & Rubber Co., Akron, O. On December 2, Mrs. Baughman found her husband's body in their garage where he had been working on their car with its motor running and garage doors closed. Efforts at resuscitation failed.

Mr. Baughman was born on a farm in Franklin township on July 28, 1868. He had been a resident of Akron since 1892. Before that he had taught school for four years near Doylestown and for two years in South Akron. His first position in Akron was teaching.

After leaving that profession he was with the Morgan Boiler Co. for a short time and some twenty years ago started with the old Swinehart Clincher Tire Co., a year later becoming secretary. The Swinehart Tire & Rubber Co., successor to the old clincher company, was thrown into bankruptcy several months ago, but

Mr. Baughman and the other officers had continued in office pending settlement of the affairs in federal bankruptcy court.

Mr. Baughman always had shown a keen interest in Akron and was one of its local boosters. He was a member of all Masonic bodies, City, Exchange, and Masonic clubs.

He is survived by his wife and his daughter, two sisters and two brothers.

Funeral services were held at the Baughman home on December 4. Rev. O. W. Haulman, pastor of Grace Reformed Church, where Baughman was a member, was in charge. Burial was in Rose Hill Cemetery.

John P. McGarry

JOHN P. McGarry, retired building contractor, Akron, O., died on December 13 of exhaustion. He was 87 years old. Burial was in St. Vincent's Cemetery. As an early Akron contractor, Mr. McGarry was associated with Dr. B. F. Goodrich in the construction of his original factory building.

CANADA

Canadian rubber goods manufacturers have announced an immediate reduction in automobile tire prices averaging between 3 and 4 per cent. Some tires are only slightly changed in price; while maximum reduction is 8 per cent.

Rubber imports reflected curtailment in the automobile industry, in October, 1929, being 4,079,000 pounds as compared with 4,274,000 the previous month and 6,593,000 pounds in October, 1928. Cumulative figures for the year to date are still substantially ahead of 1928.

Fancy rubbers introduced last season for women are taking hold very well in certain sections. Many shoe dealers see great sales possibilities in such specialties as a means of getting a little more profit in the rubber footwear department. A number of retailers declare that very few sales are made in ordinary rubbers, but with novelties, which sell on their style appeal as well as their practical qualities of protection, a substantial margin of profit may be realized.

It seems quite evident that despite some opposition, the rubber footwear business will continue using the appeal of style and novelty, and it may not be long until color and pattern are just as important as in leather footwear. Indications are that the rubber galosh may prove far more popular even than novelty rubbers or cloth galoshes. One of the extraordinary features of the rubber footwear situation is the almost total disappearance of the four-buckle galosh. One would naturally have thought that in a country such as Canada, where in many areas the winter is very severe, the old four-buckle type would continue to sell in heavy volume, as an absolute necessity. However, the demands for it have dropped considerably even in the northern towns.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont. The current *Ontario Gazette* confirms the cancellation of 4,670 shares of the common stock of this company, reducing the authorized and issued common to 145,330 in accordance with the resolution adopted by the shareholders at the annual meeting in October.

For the past three years Goodyear has been urging its dealers to add a repair department as a means of increasing profits by repairing tires and tubes, and also building up a much larger volume of new tire sales from the service they are able to render and the contact with new customers that this service brings. Goodyear's Tire Repair School has this year made a number of improvements. Fred McBrien is the instructor in charge of the school, which is now ready for the winter term.

Dominion Rubber Co., Ltd., Montreal, P. Q. The year 1929 has shown a phenomenal increase in sales of Uskide Soles. The company also recently launched a seasonal campaign featuring Gaytees, which appeared in every leading French and English daily throughout Canada.

Extensive alterations are being made in the equipment of the Dominion tire factory at Kitchener, Ont. Much of the present machinery will be replaced by newer and more efficient units to increase the plant's output. The new machines will use an additional 900 h.p.

Canadian Goodrich Co., Ltd., Kitchener, Ont., is advertising Goodrich rubber footwear in a new campaign in leading periodicals throughout the Dominion.

L. L. and J. S. McMurray, of Gutta Percha & Rubber, Ltd., were guests at a recent luncheon in Toronto, sponsored by the Canadian Manufacturers' Association to discuss "Export Trade."

Miner Rubber Co., Ltd., Granby, P. Q., is featuring Miner Shu-ettes in good-sized copy appearing in a selected list of daily mediums throughout Canada.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., developed a unique system for imprinting golf balls with the full name of the user in neat type, which does not affect the ball in play. Dunlop Maxfli golf balls were put up in attractive Christmas boxes tied with ribbon, with a suitable greeting card attached. This novel and individual Christmas gift suggestion proved very popular, and many orders reached the firm for these goods imprinted with the player's name.

E. C. Martin, general sales manager for Dunlop, recently stated that the market in Ontario for Maritime products is growing, and while in Halifax, N. S., lately, declared that an immediate closer study of the Ontario markets by Maritime manufacturers should be made.

Gutta Percha & Rubber, Ltd., Toronto, Ont., some time ago announced placing on the market rubber mats in mottled colors measuring 14 by 24 inches. Reports are that these have been selling well. The company has further announced that a larger mat of the same type is ready for distribution. It measures 18 by 30 inches, and is made in six different combinations of color.

Quebec Shoe & Rubber Co., Ltd., Quebec, P. Q., suffered a loss of several thousand dollars from a recent fire in the third floor of its factory. No machinery was damaged, but nearly all the stock was destroyed.

A. Stein & Co., Ltd., manufacturer of hose supporters and rubber goods, has moved into its new two-story factory at 51-57 Peter St., Toronto, Ont.

Eastern Canada Motor Show, staged each year in Montreal, P. Q., as the Montreal Motor Show, will be held from January 18 to 25 in the Stadium Exhibition Building as usual under the auspices of the Montreal Automobile Trade Association, Ltd.

Federal Rubber Products, Ltd., Stratford, Ont., recently inaugurated an advertising campaign featuring Velvet rubber soles.

The Howard Greenberg Tremble Co., Ltd., 4436 Wellington St., Verdun, P. Q., promoter of the Howard puncture-proof tire, has announced a reorganization to secure a strong board of directors, and has already acquired some well-known financial men. A prominent consulting rubber engineer of New York is interested, it is stated, in the company. Blanchet & Co., New York brokers, are incorporating a United States company; while Hardy Bros., of Antwerp, is forming a European company, which will include England, France, Belgium, Germany, Switzerland, Italy, and Roumania. John Howard, president, states that 50,000 shares at \$10 each will soon be issued, and he hopes to start production by spring.

Earl W. BeSaw has been named president of Firestone Canadian Ltd., the Canadian subsidiary of the Firestone Tire & Rubber Co., Akron, O.

The Rubber Industry in Europe

GREAT BRITAIN

I. R. I. Annual Meeting

The sixth annual general meeting of the London and District Section of the Institution of the Rubber Industry was held at the Engineers Club, London, on November 18, 1929. J. H. Blake presided. The following were elected to the London Committee:

C. H. Birkett, James Hancock, Ltd.; J. H. Blake, C. E. Heinke & Co., Ltd.; W. S. Davey, Ceylon Rubber Research Committee; T. R. Dawson, Research Association of British Rubber Manufacturers; J. P. Griffiths, Wm. Warne & Co., Ltd.; E. P. Kay, St. Helen's Cable & Rubber Co., Ltd.; S. C. Mote, India Rubber, Gutta Percha & Telegraph Works, Ltd.; H. W. Orme, James Lyne Hancock, Ltd.; A. E. Osborn, Macinlop, Ltd.; W. J. Perry India Rubber Gutta Percha & Telegraph Works, Ltd.; H. Standring; K. H. Standring, Avon India Rubber Co., Ltd.; E. R. Taylor, Tuck & Co., Ltd.; W. W. Watkins, W. T. Henley's Telegraph Works Co., Ltd.; Geo. E. Watson, Northern Rubber Co., Ltd.; Dr. G. H. Wallace, Firestone Tire & Rubber Co. (1922) Ltd.

Mr. Miller's Paper

At the conclusion of the meeting Eric Miller read a paper on "The Outlook of the Rubber Industry." In it he gave a complete survey of conditions and on the whole took rather a sanguine view of the future. He did not expect any heavy increase of output for the next few years and suggests that the 1930 and 1931 yields may be less than those of 1929, if Dutch native rubber is not considered. To be sure, the potential output from the latter source is considerably over the 110,000 tons produced in 1929, but this is contingent on a distinctly higher price level than obtaining at present.

"Estimates of future output," he says, "must be based largely on past experience, but they depend also on how rapidly the reserves of bark built up during the years 1922-1928 are used. The heavier the incidence of tapping today, the greater the contraction in output two or three years hence."

Increase in Absorption

The average annual increase in absorption is figured at 13 per cent, and in the last six years averaged 11 per cent. The increase of nearly 90,000 tons in the amount of rubber taken by manufacturers outside the United States during 1929, he thinks, is not likely to be repeated in 1930, because the figures by which the absorption of those manufacturers are measured must be adjusted in each of the last two years to allow for changes in working

stocks. In 1928, only 235,000 tons appeared to have been used; while in 1929 absorption is estimated about 325,000 tons. Manufacturers' stocks were depleted in 1928 and replenished in 1929, but in the absence of proper statistics the actual absorption during each of the two years cannot be accurately determined. A substantial increase occurred in each year, and the rapid development of motor transport alone will necessitate a considerable increase in future years.

"The rapid increase in world absorption during the last two years," Mr. Miller declares, "has raised some doubts as to whether absorption by manufacturers has not temporarily outdistanced real consumption. The stocks of tires in the United States are certainly greater than they were two years ago, but the registration of automobiles has also increased. The unspent mileage of the tires on the cars running today might, on account of the improved quality of the tires produced during the last eighteen months, be greater than it was two years ago, but the strain to which those tires are subjected under modern motoring conditions is also greater. . . . Unfortunately for the stability of the market, consumers allow their unspent tire mileage to be reduced when the price of rubber and tires is falling, thus accentuating the fall, and buy ahead of immediate needs when the price of rubber and tires is rising, thus accentuating the rise."

Trend of Prices

Rapid movements in price were certain, he thought, owing to the fact that the output of rubber at 9 pence per pound would be insufficient to satisfy demand for more than a limited period, and speculators would quickly seize the opportunity thus offered. Although higher prices might result in a temporary excess of rubber, he believed that over the next few years the world would absorb all the rubber produced on the present planted area, paying a reasonable price for it.

The development of wider uses of rubber should be encouraged so that the producer would be less dependent on the tire trade. But a prolonged period of stable prices would be necessary for any extensive diversion of rubber to new uses. To bring about this stability, control of output and extensions to the planted area are essential. Up to the present no attempt has been made to coordinate extensions to meet the probable expansion in consumption. As long as the price of rubber is low, no considerable new extensions either by estates or natives will be conducted on a scale adequate to the prospective needs of the world.

Bud grafted rubber should eventually

strengthen the position of the estates with regard to native rubber, but much has still to be learned concerning the new method, and for the present it should be cautiously adopted. However, it does offer the possibility that new estates of the future may be able to work profitably at a lower price than can be done at present.

Finally, he stated that it was a mistake to think that manufacturers were content to see prices of rubber at a level that might curtail supplies. They would rather see rubber at 1 shilling 3 pence than at 8 pence per pound and would be quite willing to pay the higher figure, if they could be quite sure that their competitors were not paying less. If a practicable plan for stabilizing the price could be devised, he had no doubt that the larger manufacturers would support it.

Discussion

F. D. Ascoli, director of Dunlop Plantations, discussed fluctuating prices, which in his opinion constituted the bug-bear of the industry. When prices were high, producers planted more, whereas the time to plant was when prices were low, in order to meet the shortage to come. The industry needed a regular system of planting up all new estates. The existing system is due to the fact that the industry was in such a large number of hands. At present the small producer could produce as cheaply, if not cheaper than the big producer, but in about ten years' time the former would be hard hit as his limited finances did not allow him to plant except when prices were high. Most of the planting in periods of low prices had been done by the bigger producers with adequate financial backing.

C. Jeavons said that the future of rubber production is native. It is his opinion that it is only a matter of years before the native will produce the greater part of the rubber used. He did not share the optimistic feelings regarding high yields from bud grafting.

I. R. I. Program

Forthcoming events on the Institution of the Rubber Industry's program include:

Meeting of the I. R. I., London Section, December 2, 1929, at Engineers Club, London. Paper by Dr. D. F. Twiss on "Smoke Protection for the Rubber Industry." W. F. V. Cox talked on his American tour.

December 12, I. R. I. Birmingham. Paper by H. Standring on "Outstanding Features in the Progress of the Rubber Industry."

December 19, I. R. I. Manchester Section. Symposium on Reclaim.

January 6, 1930, Q. R. Q. London Meeting.

January 9, I. R. I. Birmingham Sec-

tion. Joint meeting with Institution of Automobile Engineers. Paper by A. Healy on "The Mechanical Properties of Rubber."

January 23. I. R. I. Manchester Section. Paper by B. D. Porritt on "Some Aspects of Standardization."

January 27. I. R. I. London Section. Popular lecture by F. A. Stockdale.

February 3. I. R. I. London Section. Paper by the Northern Polytechnic and a note by B. B. Evans on "Sun Cracking of Vulcanized Rubber."

February 27. I. R. I. Manchester Section. Short paper on "Some Vulcanization Problems," by E. F. Powell.

March 3. I. R. I. London Section. Paper on "Methods and Appliances Used for the Control of Some Manufacturing Processes in the Rubber Industry," by Dr. H. A. Haynes.

Monsanto Acquires Another English Company

Further expansion in Europe of the activities of Monsanto Chemical Works, St. Louis, Mo., U. S. A., is reflected in the purchase of the Sunderland Tar Distilling Works, formerly owned by Brotherton & Co., Ltd., Leeds, England. The additional property will be taken over by Graesser-Monsanto Chemical Works, Ltd., Monsanto's English subsidiary. The plant, which is located in the County of Durham, has an annual capacity of 60,000 tons of tar and will supply important raw materials to the English subsidiary, which is the leading producer of phenol (carbolic acid) in the British Isles. This acquisition is one of several made last year by Monsanto.

GERMANY

Foreign Firms Threaten Overproduction

Within a short time four events occurred, causing surprise and comment in the rubber industry. These are: the establishment of a tire factory near Aachen by Englebert, the Belgian firm; the planning of a large tire factory, employing about 3,000, in the Rhein district by the French firm Michelin; the agreement of the Seiberling Rubber Co., Akron, O., U. S. A., with Gummiwerke Fulda, A. G.; and the purchase of the Rheinische Gummi-und Celluloidfabrik A. G., in Mannheim by the I. G. Farbenindustrie, A. G.

Commenting on what this means for the German rubber industry, *Gummi-Zeitung* points out that Englebert and Michelin are members of the German tire convention for 1929, and in this capacity will have opportunity of knowing the present situation of German tire manufacturers and Germany's tire needs. They will have learned that in recent years German tire manufacturers overproduced without working to capacity; that for this reason four tire factories merged to reduce production and to rationalize output and distribution. The periodical also questions whether the saving on the import duty by the two foreign firms will offset higher German taxes and social charges, higher wage rates, etc.

Michelin, it seems, plans to produce 1,000,000 automobile tires per annum in Germany. According to available figures, there were in July, 1929, 432,500 passenger cars, 141,600 trucks, and 606,400 motorcycles in Germany. The contemplated combined output of Michelin and of Englebert would approximate one-third of Germany's present tire demand. Incidentally, the two firms are also to produce bicycle tires; yet scarcely a single German cycle tire manufacturer utilizes fully his tire building equipment. Regarding future requirements of tires for motor vehicles, the German periodical points out that the development of the motorization of Germany is not proceeding at a rate warranting any expectation of considerable increase in the

demand for tires for the next few years.

No details are available that would suggest how the Seiberling-Fulda agreement might work out. But the acquisition of the Rheinische Gummi-und Celluloidfabrik by the I. G. Farbenindustrie is another matter. Although the I. G. F. is interested in synthetic rubber, it states that it does not intend to manufacture goods from synthetic in its recently purchased factory.

The *Gummi-Zeitung* closes its review of the matter by remarking that the four new enterprises mean an increase in production of rubber goods for which there is no corresponding demand, and this constitutes a danger for the existing rubber factories in Germany.

Kleiber's Synthetic Rubber

In connection with the reports concerning the process for the manufacture of synthetic rubber invented by the Swiss, Ernst Kleiber, which was mentioned in these columns in the December issue, the I. G. Farbenindustrie A. G., circulates the following communication:

"Of late announcements are going through the press concerning a sensational invention of a Herr Ernst Kleiber, Lugano, who is said to have succeeded in producing a high grade and exceedingly cheap synthetic rubber. In 1927, Herr Kleiber offered the I. G. Farbenindustrie A. G. (Leverkusen Works), a similar invention. Two experienced rubber chemists of the firm tested his statements in Lugano and found that Kleiber was not able to produce synthetic rubber, that on the contrary a natural rubber solution had been introduced at a certain stage of the experiment. The I. G. Farbenindustrie A. G., therefore, does not intend again to take up negotiations or tests with Kleiber."

Dr. Rudolf Dittmar, whose name was mentioned in connection with tests of Kleiber's invention, as also Dr. Werner Esch, have written to the *Gummi-Zeitung*. Dr. Dittmar says that during a three days' stay in Lugano he had the opportunity of seeing the Kleiber test carried out once. All day he was present in the room where the

experiment was performed. At night, the place was locked and only he and a gentleman representing those who had instituted the test each had a key. At a certain stage of the process Kleiber introduced crude rubber as a promoter, a proceeding that is also followed by the I. G. Farbenindustrie in its production of synthetic rubber. Dittmar was not able to stay in Lugano long enough to control the yield of synthetic rubber, but the finished product was sent to him in Graz, and showed excellent qualities.

Dr. Esch says that the process demonstrated to him in Lugano in June, 1929, did not correspond to that covered by French Patent No. 651,824 of E. Kleiber and P. Gilardi, Lugano. Nor did it entirely agree with the British Patent No. 312,741. In August, 1929, he only witnessed some vulcanization tests.

In September, 1928, at the rubber congress in Hamburg, he presented vulcanizates from samples sent from Lugano without mention of the process used. Dr. Waldemar Zieser, of Leverkusen, stated at the time that he and E. Tschunkur had been sent by the I. G. Farbenindustrie A. G., to Lugano to see a demonstration of Kleiber's process and that raw rubber had been added. What Kleiber's process was at the time Dr. Esch did not know. The addition of a certain amount of raw rubber as rubber promoter is clearly indicated in the British patent and has, therefore, not been kept secret; it also appears in patents of other inventors of so-called synthetic rubber. The price of 0.50 Swiss francs mentioned in the press differs considerably from that mentioned to Dr. Esch and could hardly be possible with the process demonstrated to him.

Factice Industry Fusion

The firms Deutsche Oelfabrik, Dr. Alexander, Dr. Bunz and Richard Petri, of Hamburg, and Georg Grandel Oelwerk, Augsburg, have combined effective on January 1, 1930. The firm of Georg Grandel will liquidate; the works in Augsburg will be shut down early in 1930; while the equipment will be gradually transferred to Hamburg, so that both factories will be able to continue operations without interruptions in the considerably enlarged works in Hamburg. The new firm is to be known as Deutsche Oelfabrik & Dr. Grandel, Hamburg 8.

Bubbles in Inner Tubes

Shortly after the arrival on the German market of certain compression inner tubes of American manufacture, the tubes showed conspicuous bubble formation. "In the interests of the industry," says the *Gummi-Zeitung* in this regard, "it is important to trace the cause of this bubble formation, especially as it seems questionable whether such bubbles are caused by compressed air when defective spots in the inner layer can no longer prevent gradual penetration. In such cases slight external injuries are generally sufficient to cause the tubes to burst before the formation of bubbles becomes apparent." The problem is left to rubber experts.

The Rubber Industry in the Far East

MALAYA

Yellow Pigment in Rubber

In the *Quarterly Manual* of the Institute, B. J. Eaton and R. G. Fullerton note that latex is at times distinctly yellow in color and that there is considerable variation in the intensity of the coloring of different latices. The color is noticeable even after the latex has been converted into crepe, but in the case of smoked sheet the tint is masked by the creosote products absorbed from the smoke. Even in cases where the latex when fresh appears to be white, the prepared crepe is generally of a distinctly uniform yellow color.

A study of the factors affecting the variation in color has not yet been made, but from observations it seems that the latex from young trees is more apt to contain this pigment than from older trees.

The quantity of the yellow coloring matter seems to increase for a short time after wintering and when a periodic system of tapping is followed, a very yellow crepe is sometimes obtained for some days when tapping is commenced after a period of rest. In the cases of budded trees, the color intensity of the latices varies from a yellow to a bright canary yellow, and to deep orange.

This question of color is important from a commercial standpoint, as in the case of sole crepe the demand is for a very pale product. To overcome this difficulty, fractional coagulation has been resorted to. This consists of adding to the latex a small quantity of coagulant, insufficient to effect complete coagulation, but enough to produce a clot of coagulated rubber which rises to the surface carrying the greater part of the coloring matter with it. This clot is removed, and the remaining uncoagulated latex is then coagulated in a separate container, the crepe obtained being almost white.

The investigation was undertaken with the object of finding some means of identifying the pigment and of establishing a satisfactory technique for its quantitative estimation in the latex and in the raw crepe rubber. Finding a suitable bleaching medium is also a problem that requires attention. The investigation has shown the existence in the unsaponifiable part of the resin of raw rubber, of a substance possessing characteristics of the hydrocarbon pigment carotin. Owing to the great color intensity of the carotin solutions it is possible to carry out a determination using a small quantity of the raw material and a calorimetric comparison of the solution under test with the standard potassium dichromate solution.

Deep and Shallow Tapping

In the Annual Report, 1928, of the late director of the Rubber Research Institute of Malaya, occurs a note regarding the dry rubber content of latex from deep and shallow tapping. On two adjoining estates belonging to the same company the manager observed that latex from one estate invariably gave a higher dry rubber content than latex from the other estate, and considered that this could be explained only by depth of tapping, the estate with deeper tapping giving latex with a lower dry rubber content and the estate with shallower tapping giving a latex with a higher dry rubber content. In order to test this, samples of latex from both estates, from deep and shallow tapping, were examined fortnightly over a period of one year.

The results confirmed the manager's opinion. The dry rubber content of the latex from both estates from shallow tapping was invariably from 1 to 3 per cent higher than that of latex from deep tapping.

Field or Nursery Budding

A revised edition of Gough's *Practical Bud Grafting and Seed Selection of Hevea Brasiliensis* has just appeared. The first edition of this book was based chiefly on experience in planting up the Prang Besar Estate. R. O. Jenkins, present manager of Prang Besar, and R. J. Chittenden, resident scientist, have brought the volume up-to-date. The authors consider that the position of bud grafting as a means of obtaining high yielding stock is established beyond question, and they quote Grantham's figures in support, showing that only 0.73 per cent of 4,500,-

000 seedlings inspected were equal in yield to a good clone.

The current objections to bud grafting have now been answered by the behavior of the clones when tapped. The yield has been maintained, bark renewal and tapping on renewed bark have been satisfactory, and clones have shown an intensive increase in yield up to ten years of age.

Experience gained as a result of budding rubber in all parts of Malaya during the last three years leads to the conclusion that as far as Malaya is concerned, field budding is just as successful as nursery budding, and if once the bud has shot, it rarely dies back. It will always be more popular in Malaya than in Sumatra because in the latter country budding in the field generally gives poor results, sometimes ascribed to a prevalent dry wind. The soil conditions there are ideal for early growth, and the loss in planting out is never great. The development of a good tap root is not of much importance where the water table is high. In the low lying areas of East Coast Sumatra, where much of the planting is done, there would be little difference in the development of the tap root between trees planted as budded stumps and those budded in the field.

One objection outweighs all the advantages of budding in the nursery, and that is that despite the utmost care, the risk of unsuitable weather arising during or after planting cannot be entirely guarded against. And where watering is impracticable, adverse weather may lead to disastrous results.

After careful consideration of all points, the authors conclude that budding in the nursery is to be recommended when the planted areas possess light soil giving satisfactory early growth.

Budding in the field should be done on all hilly land; on all heavy soils such as clay and laterite; on all poor soils; on any area where watering is for all practical purposes impossible.

NETHERLANDS EAST INDIES

Native Rubber

Last January the Rubber Growers' Association sent V. A. Tayler and John Stephens to visit the more important native rubber producing districts in the Netherlands East Indies, to obtain first-hand information concerning the extent, condition, and possible future output of native rubber. Abstracts from the report follow:

The districts visited were Pontianak and Banjarmasin in Borneo, Palembang and Jambi in Sumatra, which together account for about 70 per cent of the native output

from the Dutch colonies in the East. The natives plant rubber in the rice, and generally have a large number of trees to the acre, the number according to the investigators, ranging from 300 to 500. Failures appear to be infilled early, and with the upkeep afforded by weeding the rice, the trees usually get a good start. After the final rice harvest the land is abandoned, and scrub oralang may become established. Subsequent upkeep is negligible particularly when prices are low. The dense stand of the trees aids in suppressing undergrowth, but it also retards the

tree, which is generally one to four years behind well-grown estate trees.

The time when tapping first starts varies greatly and depends on market prices. The large number of trees per acre helps to obtain large yields for some years, the following average figures having been calculated from available data:

Age, Years	Pounds per Acre	Acres per Ton
5	300	7.5
6	400	5.6
7	600	3.7
8	700	3.2
9 and over	800	2.8

These yields are of course due to the number of trees per acre; the yield from the trees individually is another matter. A yield of 4 pounds per tree per annum for eight-year-old estate trees is considered poor. Yet the average yield per tree for native rubber with 375 trees per acre is less than 2 pounds.

Conclusions

It is impossible to suggest any scale of probable outputs correlative to varying prices of rubber. But the evidence collected points to the outputs approaching the potential with a price of 1 shilling 6 pence per pound.

Only in Jambi was there any definite evidence of an insufficiency of labor to tap the existing producing area.

There is no reason to assume that, except perhaps in Jambi, labor would not be quickly forthcoming to tap all the planted rubber in the event of rubber prices being sufficiently high.

Accepting as a basis that the four countries visited export 70 per cent of the native rubber from the Dutch East Indies, the total potential output for 1929 from that territory would be 108,500 tons. Assuming that the yield is not less than 700 pounds per acre, the lowest figure compatible with our investigations, the area of native rubber in the Dutch East Indies now producing is not less than 347,000 acres.

It is at least conceivable that new planting progressed everywhere to a great extent during the period of restricted exports from the British possessions, and if those areas are equal only to twice that of the old rubber, the planted total must approximate 1,050,000 acres.

If the rubber planted in other countries of the Dutch East Indies is comparable with that which we have seen in those visited, it is possible that the output may total as much as 300,000

tons in six to eight years' time, provided the price of rubber is in the neighborhood of 1 shilling 6 pence per pound.

The possibilities of future expansion of the planted area are almost unlimited since it is merely a matter of planting rubber in the annual hill rice clearings, probably not less than 250,000 acres of jungle and scrub being thus cleared annually in the countries visited.

With the low prices of rubber during the past fifteen months, rubber planting has steadily declined, and, except in Jambi, has now almost ceased. Until or unless an adequate rise in price again occurs, it appears likely that very little further planting will take place.

Admitting that estimation of the young (non-producing) rubber is inevitably very largely a matter of guess work, it appears to us that the only quick method by which the planted areas could be fairly correctly determined is by aerial survey.

Goodyear Tire & Rubber Co.

The Goodyear Tire & Rubber Co., it is learned, is negotiating for a large concession extending from Tandjong Poera to Besitang in Langkat, Sumatra, for rubber planting. According to reports the concession now rests with the Mij. voor Mynbouw, Bosch-en Landbouw. Exploitatie, in Langkat (The Mines, Forest, and Agriculture Exploitation Co.). The price is reported 1,500,000 guilders higher than the book-value. At present, it seems, negotiations are progressing but slowly owing to the fact that a part of the concession is rather old.

Netherlands Gutta Percha Co.

According to local press reports rubber lands formerly belonging to the Netherlands Gutta Percha Co. have been sold to Tan Wie Siong, of Kedoeng Gedeh, for 600,000 guilders. These lands include the estates Panjindangan and Giriawas in the Tjitjoeroeg district, Soekaboemi, Java, and cover 514 bouws; and Tjitarik in the Plabocan district, West Priangan, Java, covering 689 bouws. (Bouw is 1.75 acres).

Ceylon

Opinions regarding the slump in rubber prices seem in the majority of cases to be on the sanguine side; there is decidedly a feeling that it will not last much longer and that prices will not drop much further, if at all.

The cause of the slump is attributed chiefly to surplus stocks in London and the instability of the money market at present in New York. It is pointed out

that the months of October, November, and December are usually the best producing months, which would account for surplus production at the present moment.

One authority considers the situation very grave for the small holders in the outlying places like Monergalla, Kurumgalle, and Matale where the yield is small and cost of production correspondingly high. The districts like Kalutara, Kelani Valley, Ratnapura, and Pelmadulla, which all get big crops and are able to produce at 20 to 26 rupee per pound (rupee = 36 cents approximately), would not be much affected by the prevailing low prices.

French Indo-China

The special committee in France, representing the interests of the planters of French Indo-China, petitioned the French Minister of Colonies to allow the Governor General of Indo-China to come to the financial aid of the French rubber industry there. In 1919, when owing to the sudden enormous rise of the value of the piaster, the rubber planters found themselves in a precarious position, the government subsidized them. At that time the plantations were not so important as they are now. At present, owing to the American consumers' pool and the low price of rubber on the market, the plantations in Indo-China are being run at a loss, and it is difficult to find capital owing to the indifference of the investing public where rubber is concerned. Unless the French Government assist, therefore, much of the progress made will be lost and many of the plantations will be abandoned.

It seems that the financial assistance will be divided into three classes. Plantations planted between January 1, 1924, and December 31, 1926, will receive a subsidy of 40 piasters per hectare; those planted since January, 1927 will receive 20 piasters per hectare, and finally those planted before December 31, 1923, provided the plantations are still in working order, will receive the special bounty as in 1919, plus a further 10 piasters per hectare. The value of a piaster is about 42 cents, and a hectare is equal to 2.45 acres.

China

According to an official report, road improvement and extension in China is developing steadily with the result that motor transport is gaining ground. This is adequately reflected in statistics regarding China's imports of tires which in 1925 represented a value of 1,479,956 haikwan taels; in 1926, 2,133,028; in 1927, 2,385,167; and in 1928, 3,439,001 haikwan taels. An even greater increase is to be noted in the values of the imports of rubber and gutta percha sundries and footwear which in 1925 came to 1,440,215 taels; in 1926 to 2,254,212 taels; in 1927 to 3,569,595 taels; and in 1928 to 4,948,306 taels. This market, it seems, is chiefly supplied with the cheaper Japanese and European grades, but there is an increasing demand for footwear of all kinds particularly in South China.

Estimated Areas of Plantings

Districts	Acres		
	Old	Young	Total
Pontianak	53,000	159,000	212,000
Banjermasin	50,000	100,000	150,000
Palembang	53,000	265,000	318,000
Jambi	70,000	140,000	210,000
	226,000	664,000	890,000

Estimated Potential Outputs

Year	Long Tons			
	Pontianak	Banjermasin	Palembang	Jambi
1929	19,500	16,500	18,500	21,500
1930	24,500	19,000	28,500	26,000
1931	32,500	24,000	43,500	32,500
1932	42,000	29,500	61,000	40,500
1933	51,000	34,500	77,000	47,500
				210,000

* Estimated at 70 per cent of the whole of N. E. I. (Native).

Rubber Patents, Trade Marks and Designs

Machinery United States

1,733,151.* WATCHCASE VULCANIZER.

This relates to tire vulcanizers including relatively movable mold carrying sections and improved means for locking the sections together. In combination with the locking device is one for effectively breaking the mold sections apart subsequent to the curing operation. A. J. Fleiter, Akron, and H. C. Bostwick, Kenmore, assignors by mesne assignments to General Tire & Rubber Co., Akron, all in O.

1,733,692.* PNEUMATIC PRESSING MACHINE.

This machine, used in the construction of rubber overshoes, is devised for consolidating under pressure the various component pieces used in their construction. The device is so constructed that shoes of different sizes and styles may be operated upon without the necessity of readjustment of the pressing members of the machine. J. E. Perrault and L. J. Schroeder, assignors to Hood Rubber Co., all of Watertown, Mass.

1,734,023.* TIRE MAKING METHOD.

Tire fabric is applied to cores so that the fabric will be stretched evenly throughout the circumference of the core and be substantially centered upon it. C. L. Smith, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,734,242.* TIRE BUILDING MACHINE.

This device accurately guides chafing strips, sidewall strips, and so-called breaker strips into position on the tire carcass previously built on the drum. G. F. Wikle, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,734,336.* TILE ASSEMBLING MACHINE.

This apparatus assembles units of sheet material and especially strips or slabs of rubber joined edge to edge to

form a pattern sheet of floor covering. T. J. Mell, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,735,303.* INNER TUBE MACHINE.

This invention provides for rolling blanks of inner tube stock upon mandrels at the calender where the stock is formed. J. B. Tiffany, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,735,443.* CONVEYER SYSTEM.

Endless chain conveyers are used to facilitate the automatic removal of articles at positions predetermined by the loading operator. Also means for indicating respectively where they are to be and will be removed. J. T. T. Randles, H. Willshaw, and H. Smith, all of Erdington, England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

1,735,612.* WASHER CONDITIONING MACHINE.

This apparatus reduces rubber heel washers to an exact height suitable for machine distribution to the pins of a heel mold. E. Hutchens, Milwaukee, Wis.

1,735,903.* AIRBAG MACHINE.

The object is to provide a simple machine on which airbags of different sizes may be easily placed and very rapidly and thoroughly cleaned and reconditioned for further use in tire curing. J. E. Johnson, assignor to New Haven Sherardizing Co., both of Hartford, Conn.

1,736,582.* APRON CONVEYER.

This is particularly adapted for use in connection with a rubber mixing and grinding mill. It cooperates with one of the mill rolls to redeliver the stock to the rolls until such time as the stock has been thoroughly ground and mixed. After this the course of the conveyer is changed for the discharge of the stock. J. H. Davidson, assignor to Hood Rubber Co., both of Watertown, Mass.

1,733,294. WIRE CUTTER AND STRIPPER.

D. D. Cross, Detroit, Mich.

1,733,409. CONVEYER MECHANISM.

A. J.

Howe, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,733,784. VALVE STRUCTURE.

R. W. Dinzel, Bywood, assignor to Southwark Foundry & Machine Co., Philadelphia, both in Pa.

1,734,018. BEAD MATERIAL MACHINE.

N. H. Myers and E. E. Leach, assignors to Firestone Tire & Rubber Co., all of Akron, O.

1,734,337. TIRE BUILDING TOOL.

C. J. Merz, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,734,766. TIRE VULCANIZING APPARATUS.

E. Fetter, Baltimore, Md.

1,734,848. CUTTING MACHINE.

S. A. Brandon, Fresno-sur-Sarthe, France.

1,735,351. TIRE CASING MACHINE.

H. I. Morris, assignor to Cord Tire Machine Co., both of Cleveland, O.

1,735,673. TUBE DEFLATING MACHINE.

W. H. Campbell, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,735,680. TIRE BUILDING MACHINE.

J. I. Haase, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,735,689. SQUEEGEE APPLIER.

E. F. Maas, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,735,896. COLLAPSIBLE CORE.

P. De Mattia, Passaic, N. J., assignor, by mesne assignments, to National Rubber Machinery Co., Akron, O.

1,735,916. TIRE MOLD.

A. Boerder, Cleveland, O.

1,735,955. COLLAPSIBLE CORE.

B. De Mattia, Garfield, N. J., assignor, by mesne assignments, to National Rubber Machinery Co., Akron, O.

Dominion of Canada

294,280. CALENDER FEED CONTROL.

Atlantic Precision Instrument Co., Boston, assignee of A. Allen, Winchester, both in Mass., U. S. A.

294,342. SHEET MATERIAL SEPARATOR.

Seiberling Rubber Co., assignee of H. S. Alexander and F. B. Pfeiffer, all of Akron, and J. W. White, Barberton, all in O., U. S. A.

294,720. TUBE MAKING MACHINE.

Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of E. A. Murphy and D. F. Twiss, both of Birmingham, Warwick, all in England.

294,737. GUIDING APPARATUS.

Goodyear Tire & Rubber Co., assignee of E. F. Maas, both of Akron, O., U. S. A.

294,738. DEFLATING MACHINE.

Goodyear Tire & Rubber Co., assignee of W. H. Campbell, both of Akron, O., U. S. A.

294,739. WEB MANIPULATING DEVICE.

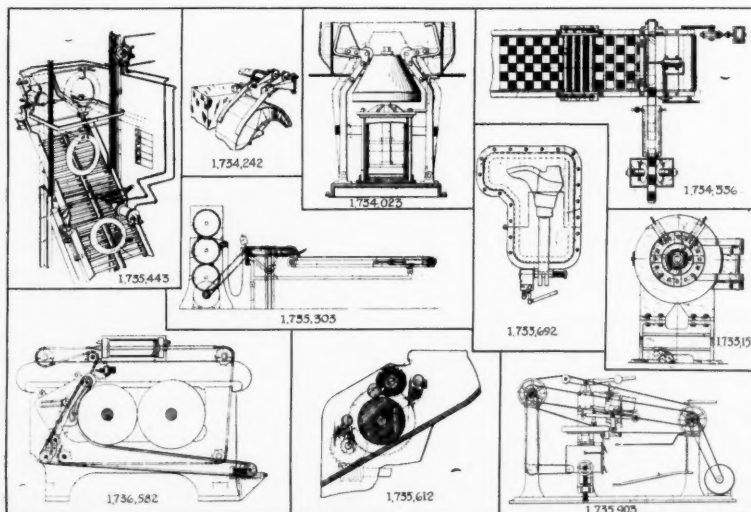
Goodyear Tire & Rubber Co., assignee of R. D. Evans, both of Akron, O., U. S. A.

294,743. INNER TUBE MACHINE.

Goodyear Tire & Rubber Co., assignee of B. C. Eberhard, both of Akron, O., U. S. A.

294,746. MOLD.

Goodyear Tire & Rubber Co., assignee of P. Keller, both of Akron, O., U. S. A.



*Pictured in group illustration.

- 294,747. SOAPSTONING DEVICE. Goodyear Tire & Rubber Co., Akron, O., assignee of L. Wetmore, Alameda, Calif., and H. E. Riggs, Akron, O., all in the U. S. A.
- 294,749. AIRBAG PUMP. Goodyear Tire & Rubber Co., assignee of E. G. Templeton, both of Akron, O., U. S. A.
- 294,959. FOOTWEAR MACHINE. Hood Rubber Co., assignee of A. A. Glidden, T. M. Knowland, and A. E. Drechsler, all of Watertown, Mass., U. S. A.
- 294,960. FOOTWEAR MACHINE. Hood Rubber Co., assignee of A. A. Glidden, T. M. Knowland, all of Watertown, and L. H. Burnham, Lexington, all in Mass., U. S. A.
- 294,961. ADHESIVE TAPE MACHINE. Johnson & Johnson, Ltd., Montreal, P. Q., assignee of C. H. Bibb and G. S. Mathey, both of New Brunswick, N. J., U. S. A.
- 295,071. WEFTLESS CORD CLOTH DEVICE. F. D. Smith, Victoria, B. C.
- 295,126. BALL GRADING DEVICE. Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of T. Cropper, Birmingham, Warwick, both in England.

United Kingdom

- 317,900. TIRE MANIPULATING DEVICE. W. H. Welch, Bishopston, Bristol.
- 318,042. MOLD OPENING DEVICE. Dunlop Rubber Co., Ltd., London. (C. S. McChesney, Kenmore, N. Y., U. S. A.)
- 319,029. GOLF BALL CASTING MACHINE. Dunlop Rubber Co., Ltd., London, H. Willshaw and S. N. Goodall, both of Fort Dunlop, Birmingham.
- 319,064. FABRIC COATING MACHINE. J. Downham & Co. (1927), Ltd., Barnbrook Iron Works, and S. Platt, Timberhurst, both in Bury.

Germany

- 486,003. PRESS FOR RUBBER MATRICES. W. Bauer, Offenbach a. M.
- 486,373. IMPREGNATING THREADS. Société du Latex, Alfortville, France. Represented by J. Spisbach, Berlin-Spischach.
- 486,519. DENTAL DISKS. P. Odze, Hannover.

Designs

- 1,091,084. ELECTRIC VULCANIZER. C. Wendt, Berlin-Schöneberg.
- 1,092,188. VULCANIZER. M. Zsurau, Berlin-Charlottenburg 5.
- 1,093,579. RUBBER THREAD GUARD. H. Muller, Elberfeld.

Process

United States

- 1,733,405. PNEUMATIC TIRE BAND. J. R. Gammett, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,733,482. TOILET SEAT. B. C. Booth, Muskegon Heights, Mich., assignor to Brunswick-Balke-Collender Co., Chicago, Ill.
- 1,733,610. NON-METALLIC PAVING BLOCK. A. H. Leipert, College Point, L. I., N. Y., assignor, by mesne assignments, to Rubber Shock Insulator Corp., Wilmington, Del.
- 1,734,241. PNEUMATIC TIRE CASING. G. F. Wike, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.
- 1,734,835. TIRE CARCASS. J. A. Strum, Watertown, Mass.

- 1,735,686. BELT JOINT. E. G. Kimmich, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
- 1,735,835. TREATING GUAYULE SEED. W. B. McCallum, Salinas, Calif.
- 1,735,986. SHOE. F. Wray, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,736,444. INSULATED CABLE. T. B. Huestis, assignor to National India Rubber Co., both of Bristol, R. I.

Dominion of Canada

- 294,274. LATEX ARTICLES. Anode Rubber Co., Ltd., London, E. C. 2, England, assignee of P. Klein, Budapest, Hungary, and A. Szegvari, Akron, O., U. S. A.
- 294,316. ELASTIC SHEET MATERIAL. Hood Rubber Co., assignee of A. A. Glidden, both of Watertown, and W. R. Hickler, Weston, all in Mass., U. S. A.
- 294,470. COTTON FIBER STUFF OF TISSUE. D. F. Wilhelmi, Heveadorp, Gelderland, the Netherlands.
- 294,654. COATING WIRE. C. D. Johnson, Worcester, Mass., U. S. A.
- 294,935. CUSHION CONNECTION. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. Saurer, Cleveland, O., U. S. A.
- 294,993. THIN-WALLED ARTICLE. I. and L. Dorogi, both of Budapest, assignee of half-interest, and Dr. Dorogi es Tarsa Gummigyar R. T., Budapest-Albertfalva, all in Hungary.
- 295,152. REINFORCED GLASS. Lancegaye Safety Glass, Ltd., London, E. C. 2, assignee of N. B. Mattingley, London, S. W. 12, both in England.

United Kingdom

- 318,289. BOOT STIFFENER. British United Shoe Machinery Co., Ltd., and W. J. Lund, both of Leicester.
- 318,336. INFLATABLE TOY. Hungarian Rubber Goods Factory, Ltd., L. Kelemen, and Z. Keleti, all of Budapest, Hungary.
- 318,360. INSOLE. Playshoe Co., Ltd., R. H. Barlow, H. Crabtree, and P. Barton, all of St. Annes-on-Sea.
- 318,435. ATTACHING RUBBER TO HOLLOW ARTICLE. Dunlop Rubber Co., Ltd., London, and W. H. Paull, Fort Dunlop, Birmingham.
- 318,825. FOOTWEAR. H. McGhee, Rushcutters Bay, near Sydney, Australia.

Germany

- 485,528. RUBBER GOODS FROM LATEX. Anode Rubber Co., Ltd., London, England. Represented by Drs. W. Karsten and C. Wiegand, Berlin S. W. 11.
- 486,461. PRODUCING RUBBER PAPER. C. Hisgen, A. G., Worms a. Rh., and J. Fochtenberger, Munich.

Chemical

United States

- 1,733,483. TREATING WOOD. J. R. Coolidge, 3d, Brookline, assignor to Montan, Inc., Boston, both in Mass.
- 1,734,309. ELECTRICAL RESISTANCE MATERIAL. T. A. Swartz and W. P. Uhler, both of Tottenville, N. Y.
- 1,734,437. PRODUCING AQUEOUS DISPERSIONS. L. Kirschbraun, Leonia, N. J.
- 1,734,531. BOX TOE PIECE. A. J. Ryan, Cincinnati, O.

- 1,734,633 to 1,734,640 inclusive. METHODS OF VULCANIZING RUBBER. H. B. Morse, Danvers, assignor, by mesne assignments, to A. C. Burrage, Jr., Ipswich, both in Mass.
- 1,734,798. RUBBER COMPOSITION. H. B. Dutton, Franklin Township, N. J.
- 1,734,951 to 1,734,953 inclusive. AGE-RESISTING COMPOUND. M. H. Zimmerman, Newington, N. H., assignor, by mesne assignments, to A. C. Burrage, Jr., Ipswich, Mass.
- 1,735,480. CLEANING COMPOUND. J. Talalay and W. Holzberg, both of Berlin, Germany, assignors to F. Pfeffer, New York, N. Y.
- 1,735,547. RUBBER COMPOSITION. J. H. Reel, Jackson Heights, and H. E. Cude, Floral Park, both in N. Y., assignors to Naugatuck Chemical Co., Naugatuck, Conn.
- 1,735,701. ACCELERATOR. G. S. Whitby, Montreal, P. Q., Canada, assignor to Roessler & Hasslacher Chemical Co., New York, N. Y.
- 1,736,404. TREATING LATEX. E. Hopkinson, New York, and M. C. Teague, Jackson Heights, both in N. Y., assignors to American Rubber Co., East Cambridge, Mass.
- 1,736,429. ACCELERATOR. S. M. Cadwell, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

Dominion of Canada

- 294,458. TREATING LEATHER. C. G. Shaw, Huntsville, Ont.
- 294,517. ACCELERATOR. I. G. Farbenindustrie A. G., Frankfurt, a/M., assignee of W. Lommel and H. Friedrich, Wiesdorf/Rhine, and T. Goost, Leverkusen/Rhine, all in Germany.
- 294,740. TREATING RUBBER. Goodyear Tire & Rubber Co., Akron, O., assignee of H. A. Bruson, Philadelphia, Pa., both in the U. S. A.
- 294,742. ANTIOXIDANT. Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, O., U. S. A.
- 294,744. UNITING RUBBER TO METAL. Goodyear Tire & Rubber Co., Akron, O., assignee of S. S. Kurtz, Jr., Philadelphia, Pa., both in the U. S. A.
- 294,745. ANTIOXIDANT. Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.
- 294,748. PREPARING AROMATIC AMINES. Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.
- 294,824. COMPOSITION. Apotela A. G., assignee of half-interest of Gebr. de Trey A. G., both of Zurich, Switzerland, A. Poller, Vienna, Austria, assignor.

United Kingdom

- 317,786.† PRESERVING RUBBER. R. B. Goodrich Co., New York, N. Y., assignee of W. L. Semon, Cuyahoga Falls, O., both in the U. S. A.
- 317,814. RUBBER SUBSTITUTE. J. W. Mounsey, W. T. Galbraith, and H. G. Bailey, all in Godalming, Surrey.
- 317,987. VARNISHES. O. Y. Imray, London. I. G. Farbenindustrie A. G., Frankfurt-on-Main, Germany.
- 318,115. SYNTHETIC RUBBER. J. Y. Johnson, London. I. G. Farbenindustrie A. G., Frankfurt-on-Main, Germany.
- 318,129.† MOLD LUBRICANT. A. Voshage, Hannover, Germany.
- 318,275. RUBBER PRESERVATIVE. O. Y.

- Imray, London. Soc. of Chemical Industry in Basle, Basle, Switzerland.
- 318,296. SYNTHETIC LATEX. J. Y. Johnson, London. I. G. Farbenindustrie A. G., Frankfurt-on-Main, Germany.
- 318,439. ELECTRICAL INSULATION. W. S. Smith, Benchams, Newton Poppleford, Devon, H. J. Garnett, Lyme, Solefields, Sevenoaks, Kent, and H. C. Channon, Kensington, London.
- 318,562. TREATING RUBBER. L. Auer, Budapest, Hungary.
- 318,717. LATEX STABILIZATION. A. J. Somer, Mottingham, London, and R. B. R. Walker, Gulmarg, Langdon Hills, Essex.
- 318,740. RUBBER SEAMING. L. and I. Dorogi and Dr. Dorogi Es Tarsa Gummigyar R. T., all of Budapest, Hungary.
- 318,865.† PRESERVING RUBBER. I. G. Farbenindustrie A. G., Frankfurt-on-Main, Germany.
- 318,967.† RUBBER SUBSTITUTE. I. G. Farbenindustrie A. G., Frankfurt-on-Main, Germany.
- 319,005.† LACQUER SOFTENING AGENT. Masa Ges. Zur Herstellung Kunstlicher Oberflächen, Berlin, Germany.

† Not yet accepted.

Germany

- 485,797. PRECIPITATION OF RUBBER. Anode Rubber Co., Ltd., London, England. Represented by Drs. W. Karsten and C. Wiegand, Berlin S.-W. 11.

General

United States

- 1,733,184. NURSING BOTTLE. W. M. Decker, Buffalo, N. Y.
- 1,733,262. HOSE AND NOZZLE. B. P. Higby, Youngstown, O.
- 1,733,416. SHAFT SEALING DEVICE. H. Lebesnereis, Vincennes, France, assignor to B. F. Goodrich Co., New York, N. Y.
- 1,733,449. SYRINGE. R. L. Cross, Seneca, Va.
- 1,733,469. REINFORCED SHEET RUBBER. B. W. Rogers, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,733,781. TYPEWRITING MACHINE. J. A. B. Smith, Stamford, Conn., assignor to Underwood Elliott Fisher Co., New York, N. Y.
- 1,733,678. FALLEN ARCH SUPPORTER. J. C. Torchia, Hazleton, Pa.
- 1,733,780. FOUNTAIN PEN FILLER. F. C. Deli and W. D. Groseclose, assignors to Autopoint Co., all of Chicago, Ill.
- 1,733,781. FOUNTAIN PEN. F. C. Deli and W. D. Groseclose, assignors to Autopoint Co., all of Chicago, Ill.
- 1,733,822. GOLF CLUB. W. F. Reach, Springfield, Mass., assignor to A. G. Spalding & Bros., New York, N. Y.
- 1,733,893. PAINT ROLLER. F. J. Lynch, assignor to Sun Tube Corp., both of Hillside, N. J.
- 1,733,948. WINDSHIELD WIPER. L. J. Deuel and C. R. Higgins, both of Medford, Oreg.
- 1,734,025. SHACKLE. B. H. Zeibig, assignor to A C Spark Plug Co., both of Flint, Mich.
- 1,734,040. WELL PACKER. J. H. McEvoy, Houston, Tex.
- 1,734,275. TIRE DEFLATION ALARM. D. B. Simpson, Wichita, Kan.

- 1,734,280. WHEEL AND TIRE. R. Vogel, New York, N. Y.
- 1,734,323. SPRING INNER TUBE. M. V. Beck, Long Beach, Calif.
- 1,734,348. TIRE ALARM. V. E. Rouch, assignor of one-half to G. L. Dice, both of South Bend, Ind.
- 1,734,380. COMPOSITE GLASS. H. K. Hitchcock, Pittsburgh, Pa., assignor to Pittsburgh Plate Glass Co., a corporation of Pa.
- 1,734,426. CANINE NASAL IRRIGATOR. G. G. Graham, Kansas City, Mo.
- 1,734,478. TOP BOOT. A. A. Glidden and T. M. Knowland, both of Watertown, and A. M. Greim, Dorchester, assignors to Hood Rubber Co., Watertown, all in Mass.
- 1,734,479. OVERSHOE FASTENER. R. M. Glidden, Watertown, Mass.
- 1,734,549. GARMENT HANGER. G. Waldy, Los Angeles, Calif.
- 1,734,700. COATED CORE. H. G. Walker, Berwyn, Ill., assignor to Western Electric Co., Inc., New York, N. Y.
- 1,734,873. SHAVING BRUSH. W. M. Neissl, Charleston, Ark.
- 1,734,976. COATING-MATERIAL CONTAINER. J. J. McClellan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,735,046. FINGER MOISTENER. C. C. Harris, Orange, Mass.
- 1,735,073. MUCILAGE DISPENSER. W. W. S. Carpenter, assignor to Sanford Mfg. Co., both of Chicago, Ill.
- 1,735,172. NECKTIE. J. E. Langsdorf, Woodmere, N. Y.
- 1,735,287. ANIMAL HEALTH DEVICE. O. Lehmann, Bienne, Switzerland.
- 1,735,369. COMPOSITE HEEL. G. H. Willis, assignor to J. L. Snyder, both of Akron, O.
- 1,735,566. FOUNTAIN PEN. G. W. Elmwall, New York, N. Y.
- 1,735,670. SAFETY NIPPLE. M. Blumenfeld, New York, N. Y.
- 1,735,700. AIRBAG VALVE. C. Van Rennes, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
- 1,735,982. RESILIENT CONNECTOR. C. R. Short, assignor to General Motors Research Corp., both of Dayton, O.
- 1,736,010. MILKING MACHINE PULSATOR. E. C. Oakes, Dunkirk, assignor, by mesne assignments, to Empire Milking Machine Co., Inc., Rochester, both in N. Y.
- 1,736,106. HOSE. F. B. Williamson, Jr., Elizabeth, N. J.
- 1,736,191. TWIN TIRE CONNECTION. W. L. Dundin and E. S. Stehl, assignors of one-third to F. E. Reynolds, one-third to said Dundin, and one-third to said Stehl, all of Seattle, Wash.
- 1,736,258. TIRE INFLATING DEVICE. J. O. Ecker, San Mateo, Fla.
- 1,736,274. TIRE INFLATING DEVICE. E. M. Morley, Delta, assignor to Air-Scale Co., Toledo, both in O.
- 1,736,425. BOWLING PIN. H. J. Bluhm, Muskegon Heights, Mich., assignor to Brunswick-Balke-Collender Co., Wilmington, Del.
- 1,736,534. TIRE DEFLATION SWITCH. B. C. S. Jensen, Frederiksberg, and J. P. Petersen, Copenhagen, both in Denmark.
- 1,736,576. ELASTIC SHOE SOLE. G. W. Cable, Marysville, Calif.
- 1,736,731. EYE DROPPER. R. W. Breeding, Philadelphia, Pa., now, by judicial order, R. G. Williams.

Dominion of Canada

- 294,209. SHOCK ABSORBER. S. T. Beare, Jackson, Tenn., U. S. A.
- 294,220. GOLF BALL CLEANER. H. Evans, Slough, England.
- 294,272. SPRINGS. American Steel & Wire Co. of N. J., Cleveland, O., assignee of F. O. Howard, Orchard Park, N. Y., both in the U. S. A.
- 294,282. PORTABLE LAMP SOCKET. Belden Mfg. Co., Chicago, assignee of H. H. Wermine, Villa Park, both in Ill., U. S. A.
- 294,301. MOTOR MOUNTING. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. Saurer, Cleveland, O., U. S. A.
- 294,348. STORAGE BATTERY CONTAINER. Joseph Stokes Rubber Co., assignee of H. L. Boyer, both of Trenton, N. J., U. S. A.
- 294,392. NON-PNEUMATIC TUBE. M. Boyko, Cleveland, O., U. S. A.
- 294,423. ELASTIC WOVEN FABRIC. H. Heltewig, Barmen-Wichl, Germany.
- 294,455. NECKTIE. T. Rochman, New York, N. Y., U. S. A.
- 294,593. FOOTWEAR. Dr. Dorogi es Tarsa Gummigyar R. T., Budapest-Albertfalva, assignee of half-interest of I. and L. Dorogi, both of Budapest, all in Hungary.
- 294,719. GOLF BALL. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. L. Fotheringham, Long Branch, N. J., U. S. A.
- 294,741. TIRE WEB. Goodyear Tire & Rubber Co., assignee of B. Darrow, both of Akron, O., U. S. A.
- 295,031. RESERVOIR PEN. F. E. Double, St. Margaret, Middlesex, England.
- 295,056. DETACHABLE HEEL. P. Lee, Windsor, Ont.
- 295,069. PNEUMATIC TIRE. H. H. Salz, Toronto, Ont.

United Kingdom

- 317,732.† ELECTRIC CABLE JOINT. G. Reittinger, Heidelberg, Germany.
- 317,880. CORD TIRE. India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and W. L. Avery, of India Rubber, Gutta Percha & Telegraph Works, Silvertown, both in London.
- 317,883. LOADED CABLE. Siemens Bros. & Co., Ltd., and A. E. Foster, Fairlawn, Old Charlton, both in London.
- 317,906. RAZOR BLADE SHARPENER. W. L. R. Amesbury, South Kensington, London.
- 318,006. WEATHER EXCLUDER. W. Wallis, Birmingham.
- 318,019. STIPPLING APPLIANCE. W. Hill, Heronsby, Barnsley.
- 318,057. DRAUGHT EXCLUDER. W. F. B. Smith, Gara, South Devon.
- 318,076. BUNG FOR METALLIC DRUM. F. B. Dehn, London. (American Flange & Mfg. Co., Chicago, Ill., U. S. A.)
- 318,091. BOTTLE POURING DEVICE. H. Ames, Highbury, London.
- 318,217.† TYPEWRITER MAT. Liga Gummiwerke Akt.-Ges., Frankfurt-on-Main, Germany.
- 318,250.† FILM. Soc. des Usines Chimiques Rhone-Poulenc, Paris, France.
- 318,261.† THERMIONIC VALVE. British Thomson-Houston Co., Ltd., London, as-

† Not yet accepted.

- signee of C. A. Gunther, Schenectady, N. Y., U. S. A.
- 318,397. **ELECTRIC TRANSFORMER.** B. Anderson and Allmänna Svenska Elektriska Aktiebolaget, both of Vasteras, Sweden.
- 318,514.† **INFANTS' SANITARY APRON.** J. H. Hoover, Woodland, Calif., U. S. A.
- 318,622.† **TIRE.** L. Harter, Wannsee, Berlin, Germany.
- 318,750. **TOOL-KIT BAG.** Dunlop Rubber Co., Ltd., London, and F. R. Carr, Fort Dunlop, Birmingham.
- 318,755. **VEHICLE FLOOR BOARD.** A. Riley, Coventry.
- 318,759. **FOUNTAIN PEN.** H. Stein, Vienna, Austria.
- 318,776. **VEHICLE FRAME CONSTRUCTION.** J. Fraser, Brooklyn, N. Y., U. S. A.
- 318,805. **TRANSFER PRINTING ROLL.** H. Wade, London. (Oxford Varnish Corp., Detroit, Mich., U. S. A.)
- 318,894.† **TIRE VALVE.** Soc. Italiana Pirelli, Milan, Italy.
- 318,934.† **PIEZO-ELECTRIC CRYSTAL.** E. W. C. Russell, Bedford, assignee of C. B. Sawyer, Cleveland, O., U. S. A.
- 319,007.† **PNEUMATIC TIERED WHEEL.** F. Kruckenberg and C. Stedefeld, both of Hannover, Germany.
- 319,069. **OVERSHOE HEEL.** Liverpool Rubber Co., Ltd., and I. W. Davies, both of Walton, Liverpool.
- 319,076. **GRAMOPHONE PICK-UP.** J. P. Miller, Fulham, London.
- 319,100. **WIRELESS RECEIVER TURNTABLE.** P. D. Tyers, Watford, Hertfordshire.
- 319,128. **CURTAIN ROD SUPPORTER.** G. A. P. Pilditch, Moorgate, London.
- 319,157. **ROAD TRAFFIC SIGNAL.** J. L. B. Jayne, Hassocks, Sussex.

† Not yet accepted.

Germany

- 485,416. **INFLATABLE TOYS.** Drs. I. and L. Dorogi, and Dr. Dorogi & Co. Gummifabrik A. G., Budapest-Albertfalva, Hungary. Represented by W. Fritze, Berlin S. W. 61.
- 485,750. **CELLULAR TUBE.** O. Bitter, Crossen, Oder.
- 486,248. **RUBBER BEARING FOR MACHINERY.** Badische Maschinenfabrik und Eisengiesserei vormals G. Sebald, und Sebald & Neff, Durlach, Baden.
- 486,396. **SOLID TIRE.** Gummie und-Kabelwerke Josef Reithoffer's Söhne A. G., Vienna, Austria. Represented by M. Wagner and Dr. G. Breitung.
- 486,399. **CUSHION TIRE.** P. Schneider, Munich.
- 486,521. **RUPTURE BAND.** A. Bahr, Solingen.
- 486,578. **PNEUMATIC TIRE.** A. Rottsieper, Berlin-Steglitz.
- Designs**
- 1,091,035. **SAFETY DEVICE FOR TIRES.** E. Lange, Berlin, O. 112.
- 1,091,167. **OVERSHOE.** Asbest und-Gummiwerke Alfred Calmon, A. G., Hamburg 39.
- 1,091,331. **INFLATABLE TOY.** A. Jacobsohn, Berlin W. 15.
- 1,091,775. **RUBBER BALL STAMP.** Beck & Co., Bruhl 13, Leipzig C1.
- 1,091,936. **BAND.** Krackow & Eiffert, Elberfeld.
- 1,092,320. **HOT WATER BOTTLE.** L. Kleimann, (née Rosenblatt,) Munich.
- 1,092,366. **RESILIENT TIRE.** Gummifabrik Grahneis & Borner, Zipsendorf, Bez. Leipzig.
- 1,093,007. **COMB.** Rheinische Gummi-und Celluloid-Fabrik, Mannheim-Neckarau.
- 1,093,029. **TYPEWRITER PAD.** H. Fischer, Gummifabrik, Harburg Wilhelmsburg 1.
- 1,093,238. **PEN RACK.** Laufer Gummifabrik Schwerdt & Renner, Hannover.
- 1,093,248. **OVERSHOE.** A. G. Rigaer Gummimanufaktur Kontinents, Riga, Latvia. Represented by Dr. L. Gottscho, Berlin S. W. 11.
- 1,093,259. **TOY.** H. Lindemann, Berlin S. W. 68.
- 1,093,280. **IODINE CONTAINER.** Richard Kallmeyer & Co., Berlin N. 24.
- 1,093,335. **CREPE RUBBER PACKING.** B. Habenicht, Hamburg 36.
- 1,093,544. **ELASTIC.** F. Undeutsch, Pausa i. V.
- 1,093,893. **BALL COVER.** Continental Gummiwerke A.G., Hannover.
- 1,093,900. **SHAVING BRUSH HANDLE.** Vulkan Gummiwarenfabrik Weiss & Baessler, A.G., Leipzig W. 33.
- 1,094,222. **RUBBER SOCK.** F. Lemmrich, Zeulenroda i. Th.
- 1,094,226. **HAIRDRESSERS' PROTECTIVE COLLAR.** G. Szajor, Breslau 3.
- 1,094,398. **PNEUMATIC CUSHION.** A. Kulbatski, Stettin.
- 1,094,672. **DETACHABLE ANTISKID DEVICE.** A. Lenhard, Karlsruhe i. B.
- 1,094,706. **SHOES FOR LADDERS.** O. Hildebrand, Dusseldorf-Oberkassel.
- 1,094,751. **STETHOSCOPE.** M. Kettner G. m. b. H., Berlin S. W. 28.
- 1,094,885. **RUBBERIZED CAP.** M. Weniger, Gumbinnen.
- 1,094,890. **MILKING APPARATUS.** Firma Ernst Aug. Roloff, Hannover.
- 1,094,991. **BOX.** Vulkan Gummiwarenfabrik Weiss & Baessler, A.G., Leipzig-Lindenau.
- 1,095,040. **AIRPLANE WHEEL.** Dunlop Rubber Co., Ltd., London, England. Represented by M. M. and Dr. R. Wirth, C. Weihe, Dr. H. Weil, all of Frankfurt a. Main, and T. R. Koehnorn and E. Noll, Berlin S. W. 11.
- 1,095,251. **CABLE.** Deutsche Kabelwerke A.G., Berlin O. 112.
- 1,095,291. **BOTTLE RING.** M. Jungbecker (née Tonndorf,) Worms.
- 1,095,385. **ANTISKID CHAIN.** Mitteldeutsche Kettenfabrik Julius Schick & Co., Frankfurt-a-Main-Niederrad.
- 1,095,646. **STOCKING.** W. Farber, Zeulenroda i. T.
- 1,095,685. **STOCKING.** J. Römpler, A.G., Zeulenroda.
- 1,095,757. **COVER FOR WATCHES.** K. Dalugge, Billhorn.
- 1,096,081. **CYCLE COVER.** J. Zimmermann, Bad Schwalbach.

Trade Marks United States

- 262,836. Double circle containing representation of clasped hands and the words: "ENDICOTT JOHNSON." Shoes of leather, rubber, or fabric. Endicott Johnson Corp., Endicott, N. Y.

- 262,837. **RYTO.** Rubber heels. E. H. Clapp Rubber Co., Boston, Mass.
- 262,838. **DRESWEL.** Rubber heels. E. H. Clapp Rubber Co., Boston, Mass.
- 262,853. **CLUB.** Pneumatic-tire casings. Trump Bros. Rubber Co., Akron, O.
- 262,931. Representation of two Highlanders sitting on either side of a circle containing the lines of a Scotch plaid and the word: "HIGHLAND." Boots and shoes of leather, rubber, or fabric, or combinations thereof. Highland Shoe Co., Inc., Akron, Pa.
- 262,933. **STUDIO STYLES DESIGNED BY LOUIE.** Shoes of leather, rubber, or fabric, or combinations thereof. H. Childs & Co., Inc., Pittsburgh, Pa.
- 262,943. Dotted outline of a shoe containing representation of a camp scene and the words: "AMERICAN SCOUT." Tennis shoes or sneakers. Endicott Johnson Corp., Endicott, N. Y.
- 262,965. **EVERLACE.** Rubber core or rubberized elastic shoe lace. S. S. Blau, doing business as Everlace Mfg. Co., Philadelphia, Pa.
- 262,966. Pentagon containing the word: "PENTA-PEDIC." Shoes of leather, rubber, or fabric. J. Edwards & Co., Inc., Philadelphia, Pa.
- 262,999. Representation of a man's head in alternating black and white blocks adjacent to the words: "THE GARTER WITH THE FRIENDLY GRIP." Men's garters. I. B. Kleinert Rubber Co., New York, N. Y.
- 263,002. **PRINCESS PEGGY.** Shoes of leather, rubber, and fabric, and combinations thereof. Goldie Shoe Co., Inc., Los Angeles, Calif.
- 263,003. **"STEDYSTEP."** Shoes of leather, rubber, and fabric, and combinations thereof. Goldie Shoe Co., Inc., Los Angeles, Calif.
- 263,101. **GRIPS.** Shoes of canvas and rubber. Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.
- 263,205. Shield containing representations of a heart and a diamond and a club and a spade in red and black respectively on contrasting backgrounds, and in gilt the word: "TRUMPS." Pneumatic-tire casings. Trump Bros. Rubber Co., Akron, O.
- 263,220. Metallic collar encircling a piece of hose. Canvas-covered metal-lined rubber hose. Metal Hose & Tubing Co., Inc., Brooklyn, N. Y.
- 263,262. **ACE HIGH.** Pneumatic-tire casings. Trump Bros. Rubber Co., Akron, O.
- 263,279. Broken border joined by the letter: "A." Tires of rubber or rubber and fabric and inner tubes therefor. Acme Co., Shreveport, La.
- 263,281. Gilt circle containing representation of a black club on a red background. Pneumatic-tire casings. Trump Bros. Rubber Co., Akron, O.
- 263,282. **MAJA-PARA.** Belting, hose, and machinery packing of rubber or rubber and fabric. Majestic Packing & Rubber Corp., New York, N. Y.
- 263,347. Shield containing the words: "RED SHIELD." Belts and hose of rubber and rubber and fabric. Mechanical Rubber Co., New York, N. Y.
- 263,456. **TEXALL.** Rubberized clothing. United States Rubber Co., New Brunswick, N. J.
- 263,521. **"IT ISN'T SAFE TO SELL SAFETY SHORT."** Steel-reinforced hard-rubber-covered steering wheels. American Hard

- Rubber Co., Hempstead and New York, both in N. Y.
- 263,697. Rectangle containing the words: "ENDICOTT JOHNSON CHARTER OAK." Boots and shoes of leather, rubber, or fabric, or of combinations thereof, having rubber composition soles. Endicott Johnson Corp., Endicott, N. Y.
- 263,736. Representation of a clock showing the hour as four, and on the base the words: "RITE TIME." Tires of rubber, fabric, and combinations thereof, inner tubes, tire and blow-out patches, and fan belts. Service Station Supply Co., Los Angeles, Calif.
- 263,743. Rectangle containing a woodland scene of a moose midstream, a smaller rectangle, two ellipses, one larger than the other, a rule, and above the latter the words: "LOUCKS MAKE." Gloves of leather, rubber or fabric, and combinations thereof. W. I. & M. A. Loucks, Inc., Gloversville, N. Y.
- 263,778. Ellipse containing the words: "ENDICOTT JOHNSON MASTER WORKMAN." Men's work shoes of leather and/or rubber or any combinations thereof, having rubber soles. Endicott Johnson Corp., Endicott, N. Y.
- 263,891. Fanciful design formed primarily by the word: "ESSENKAY" and repetitions of the letters: "S & K." Footwear of leather, rubber, or fabric, or combinations thereof. Sommer & Kaufman, Inc., San Francisco, Calif.
- 263,892. RUSCO ELASTIC PRODUCTS FRESH FROM THE LOOMS. Elastic products. Russell Mfg. Co., Middletown, Conn.
- 263,897. LOTOL. Latex compositions. Naugatuck Chemical Co., New York, N. Y.
- 263,932. Representation of a hide across and below which appear the words: "ENDICOTT JOHNSON CHARTER OAK AMERICA'S STANDARD." Boots and shoes of leather, rubber, or fabric, or combinations thereof. Endicott Johnson Corp., Endicott, N. Y.
- 263,939. THOM McAN. Shoes of combinations of leather and rubber and of rubber and fabric. Melville Shoe Corp., New York, N. Y.
- 263,945. ROYAL. Rubber heels and soles. Holtite Mfg. Co., Baltimore, Md.
- 263,946. PONTIAC'S PONTI-PED. Shoes of leather, rubber, and fabric, and combinations thereof. Pontiac Shoe Mfg. Co., Pontiac, Ill.
- 263,947. ASTRILD. Footwear of leather, cloth, and rubber. H. W. Hanan, doing business as Hanan & Son, Brooklyn, N. Y.
- 263,965. A large and a small frame having curves on each side. Rubber paint. W. P. Fuller & Co., San Francisco, Calif.
- 263,990. Rectangle containing the words: "THE PERFECT SHOE PIVOT." Footwear made wholly or partly of leather, rubber, canvas, or textile material. E. W. Durkee Last Co., Lynn, Mass.
- 264,026. Representation of a hide across and below which appear the words: "ENDICOTT JOHNSON MASTER WORKMAN AMERICA'S STANDARD." Men's work shoes of leather and/or rubber or any combination thereof. Endicott Johnson Corp., Endicott, N. Y.
- 264,030. Representation of an orchestral horn and the word: "TUBA." Golf and tennis balls. Tuba Balls Corp., Chicago, Ill.
- 264,063. Representation of a blue pennant.

Tires wholly or partly of rubber and tubes therefor. Federal Rubber Co., Chicago, Ill., and Cudahy, Wis.

- 264,226. Representation of the Fisk Boy with tire and candle before a sign showing the word: "FISK." Protective paints for tire casings and auto tops. Fisk Rubber Co., Chicopee Falls, Mass.
- 264,246. TUBA. Golf and tennis balls. Tuba Balls Corp., Chicago, Ill.
- 264,293. SCHULTZ & Co. Wearing apparel including boots and shoes of leather, rubber, fabric, or combinations thereof. H. Schultz, doing business as Schultz & Co., Terre Haute, Ind.
- 264,303. Dark background across which appears a representation of a pneumatic boat and the words: "PNEUMATICRAFT. FAST. SAFE. SILENT. LIGHT." Pneumatic boats, etc. Pneumatic Boat Corp., Newark, N. J.

Dominion of Canada

- 47,781. PUDDLE-JUMPER. Footwear of rubber, fabric and rubber, and fabric, leather, and rubber in combination. Dominion Rubber Co., Ltd., Montreal.
- 47,790. Equilateral triangle containing monogram of the letters: "C. S. Co."; above left side of triangle is the word: "WILCOX", and above right side the word: "SPECIAL"; under base of triangle the words: "THE CONTINENTAL SUPPLY CO., LIMITED", and underneath is the letter: "M"; the whole being enclosed by three parallelograms. Belting, belting hose, machinery packing, non-metallic tires and packing. Continental Supply Co., Ltd., Calgary, Alb.
- 47,791. Equilateral triangle containing monogram of the letters: "C. S. Co."; above left side of triangle is the word: "ROUGH", and above right side the word: "RIDER"; under base of triangle the words: "THE CONTINENTAL SUPPLY CO., LIMITED", and underneath is the letter: "M"; the whole being enclosed by three parallelograms. Belting of rubber and fabric, belting hose, machinery packing, non-metallic tires. Continental Supply Co., Ltd., Calgary, Alb.
- 47,792. Equilateral triangle containing monogram of the letters: "C. S. Co."; above left side of triangle the word: "SEVERE", and above right side the word: "SERVICE"; under base of triangle the words: "THE CONTINENTAL SUPPLY CO., LIMITED", and underneath is the letter: "M"; the whole being enclosed by three parallelograms. Belting, belting hose, machinery packing, non-metallic tires and packing. Continental Supply Co., Ltd., Calgary, Alb.
- 47,797. Representation of two Egyptian figures standing facing each other on a stone base. Elastic, elastic webs and cords. Jones, Stroud & Co., Ltd., "Vida" Mills, Long Eaton, Derbyshire, England.
- 47,798. VERA. Elastic, elastic webs and cords. Jones, Stroud & Co., Ltd., "Vida" Mills, Long Eaton, Derbyshire, England.
- 47,799. VIDA. Elastic, elastic webs and cords. Jones, Stroud & Co., Ltd., "Vida" Mills, Long Eaton, Derbyshire, England.
- 47,864. Seal of appropriate color having a concentric annulus of contrasting color, and across this annulus extends a cord on which is the word: "CERTIFIED"; the cord divides the seal into panels of uneven size, on one of which is the word: "DUNLOP"; the seal is superimposed on

a ribbon. Goods manufactured wholly or partly of rubber, rubber compositions, or rubber substitutes. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

- 48,002. TRUELINE. Golf balls and clubs. T. Eaton Co., Ltd., Toronto, Ont.
- 48,014. Triangular bow in which the following letters and words are inscribed in Russian: "C. C. C. P. MOCKABA", meaning "U. S. S. R. Moscow"; directly under the bow is a black circle around which the following letters are located: "B. C. H. X.", meaning "S. C. N. E." (Supreme Council of National Economy); under the above signs the name of the trust is inscribed in Russian: "PEJNHOTPEKT", which means "RESINOTREST." General. State Trust of Rubber Industry "Resinotrest," Moscow, State of U. S. S. R.

United Kingdom

- 492,316. Representation of a tire containing a vessel sailing the seas, and the word: "CLIPPER". Tires made principally or entirely of rubber. Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham.
- 494,530. EBONIUM. Floor covering composed principally of rubber. United Ebonite Manufacturers, Ltd., Chadwell Heath, Essex.
- 501,226. Circle containing representation of a diamond and the words: "RED DIAMOND." Rubber footwear. Miner Rubber Co., Ltd., Granby, P. Q., Canada.
- 502,429. SPENCER MOULTON. Rubber buffing, draw and bearing springs and bearing blocks for railway vehicles; rubber rolling rings, coupling washers, gland rings and diaphragms for railway brake apparatus; rubber tubing for railway brake installations and heating and gas systems. George Spencer, Moulton & Co., Ltd., London, S. W. 1.
- 503,964. Circle divided into various shapes, the largest one of which contains the word: "FORR." All goods in Class 40. Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham.
- 504,638. EVERLASTIC. Goods of rubber and gutta percha included in Class 40; yet excluding fabrics composed of rubber threads interwoven with textile material, and inner tubes for tires. St. Helen's Cable & Rubber Co., Ltd., Slough.
- 504,775. ENTIP. Quarter tips of rubber for heels of boots and shoes. Derrick & Hosegood. St. Jutes, Bristol.
- 505,093. FLEXO. Boot and shoe laces made of rubber material. J. D. Macdonald, Sydney, N. S. W., Australia.
- 506,241. FORTIFEX. Goods manufactured from rubber and gutta percha not included in any class but 40. Fortifex, Ltd., York.

Designs

United States

- 79,820. TIRE. Term 7 years. A. E. Jennings, Central City, Ky.
- 79,934. SHOE SOLE. Term 14 years. M. L. Paterson, Boston, assignor to Converse Rubber Co., Malden, both in Mass.

Dominion of Canada

- 8,537, 8,538, and 8,539. TIRE. Dominion Rubber Co., Ltd., Montreal, P. Q.

Imports, Consumption, and Stocks

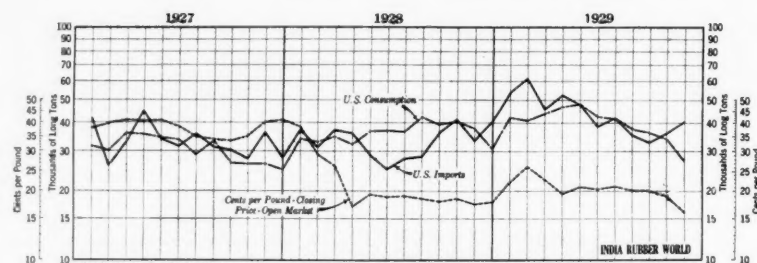
THE graphs of imports, consumption, and stocks are charted from official United States statistics by months for the years 1927 and 1928 and from January to November, 1929. The price graph represents official closing prices of the Rubber Trade Association of New York for spot ribbed smoked sheet rubber.

Imports for November were 41,500 tons or 5,460 tons more than the October figures. Consumption for November was 27,355 tons, or 7,063 less than in October. November stocks on hand were reported as 120,606 tons, stocks afloat as 62,268 tons.

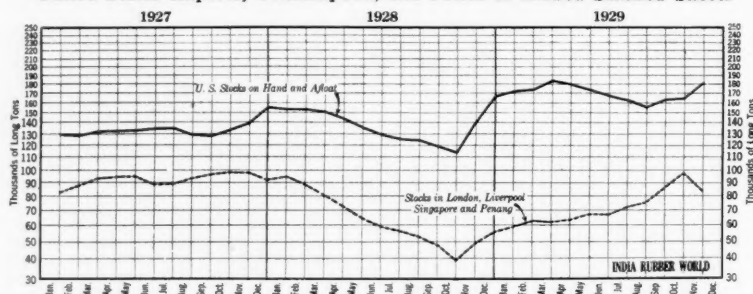
Unofficial statistical estimates for December are imports 39,000 tons, consumption 24,000 tons, and stocks afloat 64,000 tons, U. S. stocks on hand, 135,000 tons.

London stocks between November 23 and December 21 steadily increased by 2,882 tons. The weekly record is as follows: November 30, 52,538 tons; December 7, 53,431 tons; December 14, 53,180 tons; December 21, 53,894 tons.

The weekly records of stocks at Liverpool are as follows: November 30, 17,752 tons; December 7, 17,932 tons; December 14, 18,263 tons; December 21, 18,696 tons.



United States Imports, Consumption, and Prices of Ribbed Smoked Sheets



United States, British and Malayan Rubber Stocks

United States Statistics of Rubber Imports, Consumption, and Stocks

Twelve Months	*Net Imports Tons	†Consumption Tons	‡Stocks on Hand Tons	§Stocks Afloat Tons	Total Domestic Stocks Tons	British and Malayan Stocks		
						*London & Liverpool Tons	*Singapore & Penang Tons	Total Tons
1925	385,596	388,000	50,985	52,421	103,406	6,328	18,840	25,168
1926	399,972	366,000	72,510	51,238	123,748	51,320	26,443	77,763
1927	403,472	373,000	102,982	51,938	154,920	66,261	25,798	92,059
1928	407,572	437,000	73,554	92,037	165,591	22,603	32,905	55,508
1927								
January	42,107	31,694	82,923	47,020	129,943	57,065	25,440	82,505
February	26,312	30,306	78,929	48,542	127,471	61,170	26,766	87,936
March	33,207	36,343	75,793	55,561	131,354	65,634	27,843	93,477
April	45,118	36,073	84,838	47,010	131,848	69,798	24,543	94,341
May	34,135	34,787	84,186	48,531	132,717	70,099	25,133	95,232
June	31,695	33,991	81,890	52,280	134,170	66,887	21,898	88,785
July	36,116	29,383	88,623	45,664	134,287	66,776	22,568	89,344
August	21,349	33,647	86,325	42,745	129,070	67,836	25,764	93,600
September	30,264	27,367	89,222	38,230	127,452	71,505	25,178	96,683
October	28,126	26,942	90,406	42,292	132,698	72,584	25,790	98,374
November	36,619	26,943	100,082	39,517	139,599	69,896	28,369	98,265
December	28,424	25,524	102,982	51,938	154,920	66,261	25,798	92,059
1928								
January	37,552	34,065	106,469	46,441	152,910	68,660	25,868	94,528
February	31,415	33,370	104,514	48,044	152,558	65,307	22,867	88,174
March	37,468	35,335	106,647	43,378	150,025	60,405	20,538	80,943
April	36,175	32,450	110,372	32,783	143,155	55,910	16,946	72,856
May	29,112	36,965	102,519	33,145	135,664	46,882	17,687	64,569
June	25,567	37,305	90,781	38,392	129,173	41,091	18,207	59,298
July	28,362	37,040	82,103	42,943	125,046	37,818	18,663	56,481
August	38,827	42,505	68,425	54,904	123,329	34,364	18,971	53,335
September	36,800	39,490	65,735	52,692	118,427	33,673	14,898	48,571
October	41,667	40,455	66,947	45,646	112,593	26,600	12,149	38,749
November	33,846	37,095	63,698	75,502	139,200	19,988	29,188	49,176
December	40,781	30,925	73,554	92,037	165,591	22,603	32,905	55,508
1929								
January	53,992	42,530	84,946	92,480	177,426	28,966	29,617	58,583
February	61,331	41,137	105,140	74,891	180,031	29,659	32,373	62,032
March	46,391	44,238	107,293	75,848	183,141	32,540	29,437	61,977
April	52,520	47,000	112,813	66,119	178,932	35,958	27,339	63,297
May	48,475	48,692	112,596	59,526	172,122	35,828	31,932	67,760
June	38,821	42,753	108,664	57,948	166,612	35,575	31,861	67,436
July	41,114	41,069	108,709	52,078	160,787	35,599	35,473	71,072
August	35,397	37,854	106,252	48,434	154,686	43,165	33,124	76,289
September	32,912	34,325	104,839	58,954	163,793	52,214	34,291	86,505
October	36,040	34,418	106,461	61,140	167,601	62,634	34,947	97,581
November	41,500	27,355	120,606	62,268	182,874	70,290	30,913	101,203

*Official statistics. †Census Bureau figure 1925, Rubber Division survey figures other years; Rubber Manufacturers Association figures raised (from estimated 91 per cent) for months of 1929. ‡R. M. A. figures 1925 and 1926, calculated on basis of consumption and net imports thereafter. §R. M. A. figures 1925, calculated on basis official "rubber invoiced" statistics thereafter. ¶Provisional figure.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

MARKET REVIEWS

CRUDE RUBBER

New York Exchange

CRUDE rubber prices have moved with fluctuations confined to a very narrow range, but the close, on December 23, was at the low for all positions. Both January and December dipped below the 16-cent level, and prices of all the future months were the lowest for the year. Among depressing influences on the market were the continued increase of London and Liverpool stocks, larger weekly invoices to the United States, the resulting accumulation of domestic stocks, and the further curtailment of the industries that consume rubber.

The Rubber Manufacturers Association estimates the total domestic stocks of crude rubber on hand and in transit overland on November 30 at 92,219 long tons, compared with 88,483 long tons as of October 31. Crude rubber afloat for the United States on November 30 is estimated at 62,358 long tons as against 62,294 on October 1. The figures for November consumption, showing a greater decrease than had been anticipated, are 27,659 long tons compared with 34,800 long tons for October and 37,461 long tons in November, 1928.

The current season, however, is still ahead for the year and with its excess must remain so for the twelve months. Total consumption of crude rubber by American manufacturers for the first eleven months is estimated at 446,273 long tons as against 410,107 tons for 1928.

RUBBER EXCHANGE ACTIVITIES

Week Ended	Transactions		Trans-ferable Notices	Week End Tone
	Number	Tons		
Nov. 30..	1,865	4,662.5	79	Quiet and steady
Dec. 7...	1,015	2,537.5	82	Quiet and steady
Dec. 14..	1,384	3,460.0	3	Steady
Dec. 21..	1,546	3,865.0	101	Quiet and steady
Totals	5,810	14,525.0	265	

The Henderson Rubber Reports give October production of automobiles as 379,942, figures slightly over those for October a year ago, but for the first ten months of 1929 the total production of 5,017,413 cars compares with an output of 3,867,503 cars in the same period in 1928.

Commenting on automobile production, Livingston & Co. says, "Authorities in the automobile industry forecast a reduction in 1930 output of motor vehicles. The president of the Willys Overland Co. estimates a production of between 4,600,000 and 5,000,000 units in the United States and Canada, with the lower figures more acceptable. This would compare with a total estimated output of 5,700,000 units this year. The effect on the tire industry should not be so adverse as these estimates would at first imply. Car owners who will still hold on to their vehicles instead of buying new models will most certainly re-equip them with new tires, and the replacement demand should be greatly increased as a result."

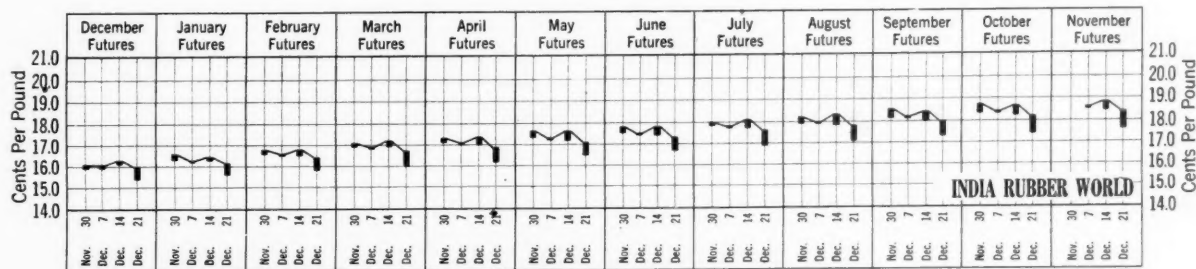
Tire inventories reached a record height in May, of 18,027,641, but the Rubber Manufacturers Association estimate for October shows a reduction of stocks to 12,844,538 casings and 13,655,866 inner tubes, compared to 11,724,643 casings and 15,285,423 inner tubes for October, 1928.

Of the inventories Harriss & Vose declares, "Present inventories are now abnormally large only if compared with those of several years ago; when due compensation is made for the greatly increased number of vehicles in daily use since then, they become little if any too heavy."

And of the automobile industry: "A recent report of the Industrial Conference Board which, in assuming the United States to be approaching a saturation point in automobile demand, draws attention to the virgin territory abroad. On the basis of the United States being 100 per cent motorized, the rest of the world shows only 8.1 per cent. While the United States has 20,525 cars for every 100,000 population, Europe has but 766; Oceania 8,052; Africa 213; and Asia 40 cars. These and other data indicate tremendous possibilities to the American motor industry which, with its cheap and efficient means of production, is able to compete very successfully in foreign fields."

In evidence of the increasing demands abroad the Department of Commerce states that the annual world rubber absorption has passed the 800,000-ton mark, and that the decline in American consumption has been balanced by increase in the foreign takings. Gross exports from Malaya for the eleven months were of the record fig-

New York Rubber Exchange Clearing House Prices—High and Low Weekly Changes on "A" Contracts for Monthly Futures



The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—"A" CONTRACTS

Positions	November, 1929					December, 1929																	
1929	25	26	27	28*	30	2	3	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21
November	15.6	15.7	15.6	15.5	15.5	15.9	15.9	16.0	16.1	16.0	16.1	16.1	16.2	16.3	16.1	16.2	16.2	16.0	16.0	15.8	15.7	15.6	15.4
December	16.0	16.1	16.0	15.9	16.0	15.9	15.9	16.0	16.1	16.0	16.1	16.1	16.2	16.3	16.1	16.2	16.2	16.0	16.0	15.8	15.7	15.6	15.4
1930																							
January	16.4	16.6	16.3	16.3	16.3	16.4	16.3	16.2	16.3	16.3	16.3	16.4	16.5	16.5	16.3	16.3	16.3	16.2	16.2	16.0	15.9	15.7	15.6
February	16.7	16.8	16.6	16.6	16.6	16.7	16.6	16.5	16.6	16.6	16.6	16.7	16.8	16.8	16.6	16.6	16.5	16.4	16.4	16.2	16.1	15.9	15.8
March	17.1	17.1	16.9	16.9	16.9	17.0	16.9	16.8	16.9	16.9	16.9	17.0	17.1	17.2	17.0	16.9	16.9	16.7	16.6	16.4	16.3	16.2	16.0
April	17.3	17.3	17.1	17.1	17.1	17.2	17.1	17.0	17.1	17.1	17.1	17.2	17.3	17.4	17.1	17.1	17.0	16.9	16.8	16.6	16.5	16.3	16.2
May	17.6	17.6	17.3	17.3	17.3	17.4	17.3	17.2	17.3	17.3	17.3	17.5	17.6	17.6	17.3	17.3	17.2	17.1	17.1	16.9	16.7	16.5	16.5
June	17.8	17.8	17.5	17.5	17.5	17.6	17.5	17.4	17.5	17.5	17.5	17.7	17.8	17.8	17.5	17.5	17.4	17.3	17.3	17.1	16.9	16.7	16.7
July	17.9	18.0	17.8	17.8	17.8	17.9	17.8	17.7	17.8	17.8	17.7	17.7	17.9	18.0	18.1	17.7	17.8	17.7	17.6	17.5	17.3	17.1	17.0
August	18.2	18.2	17.9	17.9	18.0	18.1	18.0	17.9	18.0	18.0	17.9	17.9	18.1	18.2	18.3	17.8	17.9	17.9	17.8	17.7	17.5	17.3	17.2
September	18.4	18.5	18.1	18.1	18.2	18.3	18.2	18.2	18.1	18.1	18.1	18.3	18.4	18.4	18.0	18.1	18.0	18.0	17.9	17.7	17.5	17.5	17.3
October	18.6	18.7	18.3	18.3	18.4	18.5	18.4	18.4	18.4	18.3	18.3	18.5	18.6	18.6	18.6	18.2	18.3	18.3	18.2	18.0	17.8	17.6	17.6
November	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.5	18.5	18.5	18.7	18.7	18.8	18.4	18.4	18.4	18.4	18.2	18.0	17.8	17.8	17.7

*Holiday.

ures of 531,410 tons; while the November shipments to the United States were but 28,545 tons against 44,905 tons in that month last year.

During the week ended November 30 trading was quiet with an average daily turnover of 932 tons and price changes that were small. London stocks increased by 1,526 tons to a total of 52,538 tons. At Liverpool there was also an increase of 273 tons, making the total 17,752 tons. The trend of prices was downward on all positions, but the decline was slight and the high and low range narrow. Prices for the week ended November 30 were:

Position	High	Low	Close	Previous Close
Dec.	16.10	16.10	16.00	15.90
Jan.	16.40	16.40	16.40	16.30
Feb.	16.70	16.70	16.70	16.60
Mar.	17.10	17.10	17.00	16.90
Apr.	17.40	17.40	17.20	17.10
May	17.40	17.40	17.40	17.30
June	17.90	17.90	17.60	17.50
July	17.90	17.90	17.90	17.80
Aug.	18.40	18.40	18.10	18.00
Sept.	18.40	18.40	18.30	18.20
Oct.	18.50	18.50	18.50	18.40

During the week terminated December 7 the activity of the market was much less than the week previous. Daily transactions averaged but 169 lots equivalent to 422½ tons. All positions lost ground during the week, and the market closed quiet and steady. The sales for the two-hour session of Saturday, December 7, amounted to 47½ long tons.

Commenting on the market conditions of the week, Lamborn Hutchings said, "Little of interest has occurred in the crude rubber market during the week ended December 7, which has been one of the duller in considerable time. Fluctuations on the futures exchange have been extremely narrow and trading on most days light. It is doubtful that there is any outstanding long or short interest in

the futures market except perhaps in the more distant positions, where there is thought to be a fairly liberal short interest existing. Under these circumstances, and with the market having apparently well discounted the recent general run of adverse developments, sentiment is inclined to be turning gradually somewhat more optimistic, the feeling being that the market is now in a good position to reflect readily constructive news."

Prices for the week ended December 7 were:

Position	High	Low	Close	Previous Close
Dec.	16.10	16.10	16.10	16.00
Jan.	16.30	16.30	16.30	16.30
Feb.	16.60	16.60	16.60	16.60
Mar.	16.90	16.90	16.90	16.90
Apr.	17.10	17.10	17.10	17.10
May	17.30	17.30	17.30	17.30
June	17.50	17.50	17.50	17.50
July	17.70	17.70	17.70	17.70
Aug.	17.90	17.90	17.90	17.90
Sept.	18.20	18.20	18.10	18.10
Oct.	18.30	18.30	18.30	18.30
Nov.	18.50	18.50	18.50	18.50

The market for the week ended December 14 continued quiet with prices within a narrow range. Average daily transactions were 577 tons.

Switching of January contracts to the forward months accounted for a considerable part of the trading. A decrease in eastern dealers' stocks had a temporary favorable influence, but in the absence of aggressive buying prices reacted again. The report of the Rubber Manufacturers Association on decreased November consumption had little effect. After remaining for some time at 8 pence, London firmed up when the Malayan census figures showed an unexpected decrease in dealers' stocks.

The crude rubber stocks at London at the end of the week amounted to 53,180 tons or 251 tons less than the previous week. At Liverpool stocks increased 341 tons to a total of 18,263 tons.

On December 14 the closing prices were:

Position	High	Low	Close	Previous Close
Dec.	16.10	16.10	16.00	16.20
Jan.	16.20	16.20	16.20	16.30
Feb.	16.40	16.40	16.40	16.50
Mar.	16.80	16.70	16.70	16.90
Apr.	16.90	16.90	16.90	17.00
May	17.20	17.10	17.10	17.20
June	17.30	17.30	17.30	17.40
July	17.60	17.60	17.60	17.70
Aug.	17.80	17.80	17.80	17.90
Sept.	18.10	17.90	18.00	18.00
Oct.	18.20	18.20	18.20	18.30
Nov.	18.40	18.40	18.40	18.40

Trading during the week closed December 21 was slightly more active than in the week previous. Transactions averaged 642 tons daily. Stocks at London the end of the week amounted to 53,180 tons or 251 tons less than the previous week, and at Liverpool stocks increased 341 tons to a total of 18,263 tons.

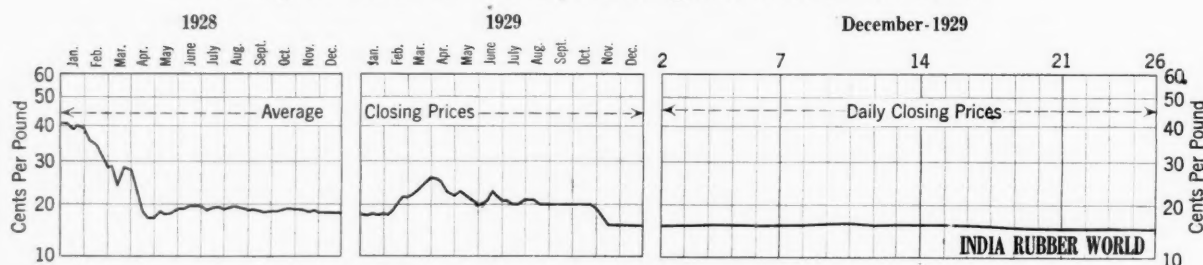
The week was uneventful and prices closed December 21 at essentially the same levels as on the 14th.

Position	High	Low	Close	Previous Close
Dec.	16.20	16.20	16.20	16.20
Jan.	16.30	16.30	16.30	16.30
Feb.	16.50	16.50	16.50	16.60
Mar.	16.90	16.80	16.90	16.90
Apr.	17.00	17.00	17.00	17.10
May	17.40	17.30	17.20	17.30
June	17.40	17.40	17.40	17.50
July	17.90	17.80	17.70	17.80
Aug.	17.90	17.90	17.90	17.90
Sept.	18.20	18.20	18.00	18.10
Oct.	18.40	18.40	18.30	18.30
Nov.	18.40	18.40	18.40	18.40

In connection with the general crude rubber situation at the close of the year the following comments have considerable interest.

Contrary to the depressing reports that seem to predominate is one in the special sheet from the Rubber Exchange: "All the large tire manufacturers in the Akron district plan to step up production after the first of the new year. The Goodyear Tire & Rubber Co. recently went on a production basis of 42,000 tires daily, and will increase its production schedule to 60,000 daily.

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

PLANTATIONS	November, 1929										December, 1929										
	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sheet																					
Ribbed smoked.....	16½	16½	16	16	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½
Cream																					
First latex.....	17	17½	17	17	17½	17½	17	17½	17½	17½	17	17½	17½	17½	17½	17½	17½	17½	17½	17½	17½
"B" blanket.....	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½
"C" blanket.....	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½
"D" blanket.....	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 2 brown.....	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½
Rolled brown.....	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½
Off latex.....	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½

*Holiday.

"The new Gadsden, Ala., plant of the same manufacturer will operate the tire departments at full capacity, beginning January 2, boosting production to 7,000 tires daily.

"The United States Rubber Co., has announced that the output of its tire plant will be substantially increased, during 1930, over the current year."

"Mincing Lane (London) believes that the peak of production has been reached, and many indications support this opinion. Current flush yields, now widely attributed to six years of bark replenishment during restriction, can hardly be maintained, even if the rubber trees do withstand much hard usage. Eventually their productivity must be weakened by such drastic tappings as have been recently in vogue. This is especially true of the native Asiatic areas where owners, largely subsisting on a hand-to-mouth basis, respond to lower prices by heavier tappings, thus setting up a vicious circle that can only conclude by defeating its own ends."

On December 23, December rubber fell to 15.10 cents. Futures closed steady, unchanged to 30 points decline from Saturday's close. Sales amounted to 446 lots or 1,115 long tons. At London the market closed dull, 1/16 to 1/8 pence decline from Saturday's close. Stocks of crude rubber at London on the 21st increased by 714 tons to a total of 53,894

tons, and at Liverpool the stocks increased by 433 tons to a total of 18,696 tons.

On December 24, the market rallied and closed with an improvement of 10 to 30 points over the levels of December 23. The total sales were 160 lots or 400 long tons. December rubber closed at 15.50 cents.

At London the market closed quiet, unchanged to 1/16 pence advance over the previous day's close. It remained closed until December 27.

On December 26, the market for December rubber opened at 15.60 and advanced 20 points early in the session. During this last day of trading, which marked the close of December futures, prices advanced to 15.80, but declined 20 points at the close, which was steady. All other positions were steady and unchanged from previous day's close. Total sales were 35 lots, or 87½ long tons.

New York Outside Market

The market for actual rubber in December was practically without buying interest. Rubber is abundant and very cheap. Rubber goods manufacturers being sufficiently well stocked for immediate needs seem quite willing to postpone their interest in future positions until the outlook of the new year becomes more apparent. Akron reports indicate resumption of tire produc-

tion at levels much above those prevailing since October, and the intention is indicated to advance the output steadily until spring.

Standard ribbed smoked sheets on spot on November 25 was 16½ cents and on December 23 was 15¾ cents. The highest price during this interval was 16¼ cents and lowest 15¾ cents. The steadiness of the price reflected the uniform absence of buying interest.

A mid-week holiday occurred in the week ended on November 30, which served to divide the market into two equally quiet and uninteresting periods. Prices were steady at 16½ to 16¼ for spot ribs, closing on November 30 at the latter figure.

Spot	Nov. 30	Month Ago	Year Ago
Cripe	17½	19½	18½
Ribs	16½	18½	17½
Upriver fine	16½	19½	19½

There was but slight improvement of buying interest in the market that closed on December 7 over that of the previous week. The tone was steady and a few scattering inquiries appeared. From Monday to Saturday spot ribs varied only ½-cent a pound, the range being from 16½ cents on Monday to 16¼ cents on Saturday.

Spot	Dec. 7	Month Ago	Year Ago
Cripe	17½	17½	18½
Ribs	16½	17	18
Upriver fine	16½	17½	19½

Interest in the market of the week that terminated on December 14 was very little

New York Quotations

Following are the New York outside market rubber quotations for one year ago, one month ago, and December 26, the current date

Plantation Hevea				South American			
December 26, 1928				December 26, 1928			
Rubber latex (Hevea)... gal.				December 26, 1929			
1.40 @				1.25 @			
CREPE				PARAS—Continued			
First latex, spot.....	.18½ @	.17 @	.16½ @.16¾	Peruvian, fine.....	\$.019 @	\$.015 @	\$.015½ @
December.....	.18½ @.18¾	.17¼ @	.16½ @.16¾	Tapias, fine.....	.19¼ @	.15 @	.15½ @
January-March.....	.18½ @	.17½ @.18	.16¾ @.16¾	CAUCHO			
April-June.....	.18½ @	.18½ @.18¾	.17½ @.17¾	Upper caucho ball.....	.13 @	.08¼ @	.08¼ @
Off latex, spot.....	.18½ @	.16½ @.16¾	.15¾ @.16	Upper caucho ball.....	*.19¼ @	*.15 @	*.14¼ @
"B" Blanket, spot.....	.17 @	.14¼ @.14½	.13½ @.14	Lower caucho ball.....	.12¼ @	.07¼ @	.07¼ @
December.....	.17 @	.14½ @.14¾	.13½ @.14	Maniobas			
January-March.....	.17 @	.14½ @.15	.13¾ @.14	Ceará negro heads.....	†.17 @	†.20 @	†.19 @
April-June.....	.17¼ @	.15 @.15½	.14½ @.14¾	Ceará scrap.....	†.09 @	†.12 @	†.11 @
"C" Blanket, spot.....	.16¾ @	.13¾ @.14	.13½ @.13¾	Manicoba, 30% guaranteed.....	†.19 @	†.22 @	†.21 @
Brown No. 1.....	.16¾ @.17	.14¼ @.14½	.13¾ @.14	Mangabiera, thin sheet.....	†.19 @	†.22 @	†.21 @
Brown No. 2.....	.16¾ @.16¾	.13¾ @.14	.13¾ @.13¾	Centrals			
Brown, roll.....	.13¾ @.13¾	.10¾ @.10¾	.09½ @.10	Central scrap.....	.11½ @.12	.07 @.08	.07 @.07½
Sheet				Central wet sheet.....	.08 @.10	.07 @	.07 @
Ribbed, smoked spot.....	.17¾ @.18	.16 @.16¼	.15½ @.15¾	Corinto scrap.....	.11½ @.12	.07 @.08	.07 @.07½
December.....	.17¾ @.18	.16¼ @	.15½ @.15¾	Esmeralda sausage.....	†.11½ @	.07 @.08	.07 @
January-March.....	.18 @.18¼	.17 @.17¼	.15¾ @.15¾	Guayule			
April-June.....	.18¾ @.18¾	.17½ @.17¾	.16¾ @.16¾	Duro, washed and dried....	.17½ @	.17 @	.17 @
East Indian				Ampar.....	.18½ @	.18 @	.18 @
PONTIANAK				Gutta Percha			
Banjermasin.....	.11 @	.06 @.08	.08½ @	Gutta Siak.....	.23½ @	.17½ @.18½	.14½ @.15½
Pressed block.....	.20 @.21	.13 @.14	.14¾ @	Gutta Soh.....	†.35 @	.28 @	.20 @.22
Sarawak.....	†.10 @	.09 @	.08½ @	Red Macassar.....	2.95 @	2.50 @	2.30 @.250
South American				Balata			
PARAS				Block Ciudad Bolivar.....	.49 @.51	.40 @.42	†.41 @
Upriver, fine.....	.20 @	.16 @	.16¾ @	Colombia.....	.48 @	.38 @.40	†.39 @
Upriver, fine.....	*.25¼ @	*.23¼ @	*.23¼ @	Manaos block.....	.55 @.57	†.50 @	.45 @
Upriver, coarse.....	.14¼ @	.08¼ @	.08 @	Panama.....	.48 @	.37 @.39	.39 @
Upriver, coarse.....	*.19½ @	*.15 @	*.14½ @	Surinam sheet.....	.49 @.50	.51 @.53	†.52 @
Islands, fine.....	.25¼ @	.23 @	*.22¼ @	Amber.....	.53 @.55	.53 @.55	†.54½ @
Islands, fine.....	*.25¼ @	.23 @	*.22¼ @	Chicle			
Acre, Bolivian, fine.....	.20¾ @	.16½ @	.16½ @	Honduras.....	†.68 @	†.68 @	†.68 @
Acre, Bolivian, fine.....	*.26½ @	*.24 @	*.23½ @	Yucatan, fine.....	†.68 @	†.68 @	†.68 @
Beni, Bolivian.....	.21 @	.16¾ @	.16¾ @	Footnotes			
Madeira, fine.....	.20 @	.16 @	.16¾ @	*Washed and dried crepe. Shipment from Brazil.			
				†Nominal. †Duty paid.			

if any more than in the previous week. The price of spot ribs was 16¼ cents on Monday and moved up Tuesday and Wednesday to 16½ cents. It then fell off sharply and closed the week at 16¼ cents. There was some quiet trading and a little factory interest for January-February rubber.

Spot	Dec. 14	Month Ago	Year Ago
Crepe	17½	17½	18½
Ribs	16½	16½	18
Upriver fine	16	16½	19½

In the week ended on December 21 trading was flat and the market virtually lifeless in the absence of factory buying. The week opened with spot ribs weak at 16¼ cents. The price dropped ¼-cent each day and on Thursday reached 15½ cents. On Friday it dropped ¼-cent and closed steady at that price on Saturday. The market was easier also on forwards with nothing doing.

Spot	Dec. 21	Month Ago	Year Ago
Crepe	16½	16½	18½
Ribs	15½	16	17½
Upriver fine	16	16½	19½

The market for actuals on December 23, was bearish with only a few dealers and trade operators providing absorption for the day's selling. In the Exchange market only three more December notices were issued bringing the total to 266. In the outside market December ribs closed at 15½ cents bid, 15½ cents asked. First latex was 16 cents bid, 16¼ cents asked.

On December 24, the news from the tire manufacturing centers was favorable to the constructive rather than to the bearish side of the market. It was considered that the Exchange market low record of 15.10 cents for December rubber was a factor in bringing the actuals down to a basis at which importers and manufacturers could buy freely. The present large stocks of crude for consumption will be heavily drawn upon in January as the factories increase their output to fill spring dated orders.

December ribs closed unchanged from the previous day. White spot latex closed at 16¼ cents bid, 16½ cents asked.

On December 26, there was absolutely no interest on the part of consumers in spot standard ribs at 15.60 cents, and no revival of consuming demand was expected until after the turn of the year.

Importations of all grades in November were 40,621 tons compared to 34,720 tons one year ago. Plantation arrivals for November were 39,932 tons, compared to 33,771 tons one year ago. Total importations of plantation rubber for eleven months ended November 30 were 506,403 tons compared to 383,705 tons for the corresponding period of 1928. Total importations of all grades of rubber for the eleven months ended November 30 were 517,913 tons compared to 399,581 tons for the corresponding period of 1928.

Singapore Stocks

Dealers' stocks on November 30, 1929, in Singapore, Penang, Malacca, Province of Wellesley, and Dindings, totaled 32,598 tons, compared with 36,366 tons on October 31, 1929. Singapore and Penang harbor stocks were 1,058 tons on November 30, 1929.

OFFICIAL CRUDE RUBBER TYPE SAMPLES

Revised October 4, 1929

These specifications constitute the complete list of crude rubber type samples, recently revised by the Crude Rubber Committee of the Rubber Manufacturers Association.

Special attention is directed to the wrapper sheet and packing regulations, and rubber manufacturers are requested to specify these requirements in their crude rubber transactions.

RIBBED SMOKED SHEETS

N. 1-X. STANDARD QUALITY RIBBED SMOKED SHEETS, EUROPEAN ESTATES. Deliveries must conform to average quality represented by this sample. Shipments desired entirely free from mold but very slight traces of dry edge and/or dry top mold at time of delivery not to be objected to. Rubber to be packed in cases. Each package of rubber shall be carefully and completely wrapped on all sides with equal quality rubber.

No. 1. STANDARD QUALITY RIBBED SMOKED SHEETS, EUROPEAN AND/OR NATIVE ESTATES. Deliveries must conform to average quality represented by this sample. Very slight traces of dry edge and/or dry top mold at time of delivery not to be objected to. Rubber to be packed in cases. Each package of rubber shall be carefully and completely wrapped on all sides with equal quality rubber.

No. 2. GOOD FAIR AVERAGE QUALITY RIBBED SMOKED SHEETS, EUROPEAN AND/OR NATIVE ESTATES. Deliveries must conform to average quality represented by this sample. Slight traces of dry edge and/or dry top mold at time of delivery not to be objected to. Rubber to be packed in cases. Preference to be given to shippers who carefully and completely wrap each package with equal quality rubber, but such wrapping is not essential to constitute good delivery.

No. 3. FAIR AVERAGE QUALITY RIBBED SMOKED SHEETS, EUROPEAN AND/OR NATIVE ESTATES. Deliveries must conform to average quality represented by this sample. Dry top and/or dry edge and/or slight dry spot mold not exceeding 10 per cent at time of delivery not to be objected to. Rubber to be packed in cases. Preference to be given to shippers who carefully and completely wrap each package with equal quality rubber, but such wrapping is not essential to constitute good delivery.

No. 4. LOW FAIR AVERAGE QUALITY RIBBED SMOKED SHEETS, EUROPEAN AND/OR NATIVE ESTATES. Deliveries must conform to average quality represented by this sample. Dry top and/or dry edge and/or dry spot and/or slight dry center mold not exceeding 20 per cent at time of delivery not to be objected to. To be free from virgin and undercured rubber. Rubber to be packed in cases. Preference to be given to shippers who carefully and completely wrap each package with equal quality rubber, but such wrapping is not essential to constitute good delivery.

No. 5. INFERIOR FAIR AVERAGE RIBBED SMOKED SHEETS, EUROPEAN AND/OR NATIVE ESTATES. Deliveries must conform to average quality represented by this sample. Dry top and/or dry edge and/or dry spot and/or dry center mold not exceeding 30 per cent at time of delivery not to be objected to. To be free from virgin rubber. Rubber to be packed in cases. Preference to be given to shippers who carefully and completely wrap each package with equal quality rubber, but such wrapping is not essential to constitute good delivery.

THICK LATEX CREPES

No. 1. STANDARD QUALITY THICK PALE LATEX CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases.

No. 2. FAIR AVERAGE QUALITY THICK OFF LATEX CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases.

THIN LATEX CREPES

No. 1-X. FINE THIN PALE LATEX CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases. Each package of rubber shall have at least a two-ply wrapper on all sides of equal quality crepe.

No. 1. STANDARD QUALITY THIN PALE LATEX CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases. Each package of rubber shall have at least a two-ply wrapper on all sides of equal quality crepe.

No. 2. FAIR AVERAGE QUALITY THIN OFF LATEX CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases. Each package of rubber shall have at least a two-ply wrapper on all sides of equal quality crepe.

BROWN CREPES

No. 1-X. CLEAN THIN LIGHT BROWN CREPE, EUROPEAN ESTATES. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases.

No. 2-X. CLEAN THIN BROWN CREPE, EUROPEAN ESTATES. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases.

No. 1. CLEAN THIN LIGHT BROWN REMILLED CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases preferably, but bales acceptable unless otherwise agreed upon.

No. 2. CLEAN THIN BROWN REMILLED CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases preferably, but bales acceptable unless otherwise agreed upon.

No. 3. BROWN TO DARK BROWN SPECKY EUROPEAN ESTATE AND/OR REMILLED CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases preferably, but bales acceptable unless otherwise agreed upon.

BLANKET CREPES

"B" LIGHT BROWN BLANKET CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases preferably, but bales acceptable unless otherwise agreed upon.

"C" BROWN BLANKET CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases preferably, but bales acceptable unless otherwise agreed upon.

"D" DARK BROWN BLANKET CREPE. Deliveries must conform to average quality represented by this sample. Rubber to be packed in cases preferably, but bales acceptable unless otherwise agreed upon.

November Consumption and Stocks

Consumption of crude rubber of all classes by manufacturers in the United States in November is estimated at 27,659 long tons, according to statistics compiled by The Rubber Manufacturers Association. This compares with estimated consumption of 34,800 long tons in October and 37,461 long tons in November, 1928. Total consumption of crude rubber by American manufacturers for the first eleven months of this year is estimated at 446,273 long tons. Consumption during the first eleven months of 1928 was 410,107 long tons.

The association estimates total domestic stocks of crude rubber on hand and in transit overland on November 30 at 92,219 long tons compared with 88,483 long tons as of October 31. Crude rubber afloat for United States ports on November 30 is estimated at 62,358 long tons as against 62,294 long tons on October 31.

Rubber Afloat to the United States

All figures in long tons

Week Ended	British Malaya	Ceylon	Netherlands East Indies	London and Liverpool	Total
Nov. 30..	6,672	1,404	2,205	9	10,290
Dec. 7..	8,543	1,920	2,115	16	12,594
Dec. 14..	7,428	1,299	1,655	6	10,388
Dec. 21..	7,599	1,953	2,003	22	11,577

Brazilian Exports and Stocks

Exports of crude rubber from the Amazon Valley in November, 1929, totaled 1,442 long tons, destined to United States 559; Europe 788; and Brazil 95 long tons. Stocks on November 30, 1929, were: Para 2,196 long tons in first hands, 1,041 long tons in second hands; Manaus 570 and 26 long tons.

RECLAIMED RUBBER

DURING December reclaiming plants operated at a moderate pace chiefly because of seasonal preinventory slackness of deliveries to rubber manufacturers. Reclaim production in September and October was practically identical at close to 18,700 tons. In November the production was 14,363 tons, a reduction of 23 per cent. December production is thought to be at the same rate as for November.

The outlook for the prompt increase of reclaim output is considered favorable because the leading tire manufacturing companies of Akron have scheduled increased production for January 1, 1930. A larger volume of tires is on hand than at this time a year ago. Tire production has an important influence on the consumption of

reclaim because it constitutes about 80 per cent of the rubber goods industry.

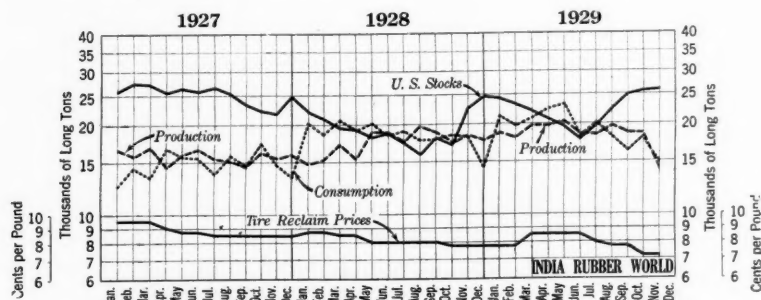
If the demand materializes as forecast by the present outlook, consumption of reclaim in 1930 should equal that for 1929. The estimated production and consumption of reclaim for 1929 are as follows: production, 219,700 tons; consumption, 227,900 tons.

The Rubber Reclaimers Association will meet January 7 to elect officers for the ensuing year.

New York Quotations

December 26, 1929

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black...	1.20	\$0.12 @ \$0.12½
red	1.20	.11 @ .11½



Production, Consumption, Stocks, and Prices of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929					
January	16,526	12,374	39.3	25,903	726
February	15,860	14,424	47.8	27,291	671
March	16,788	13,528	37.4	27,124	785
April	14,483	16,677	46.5	25,712	899
May	16,159	15,754	46.1	26,419	934
June	16,652	15,547	46.0	25,811	683
July	15,488	13,842	47.4	26,599	674
August	15,109	15,836	47.3	25,157	629
September	14,392	14,790	54.3	23,429	538
October	16,127	17,292	64.5	22,176	571
November	15,477	14,876	55.5	21,728	700
December	16,083	13,431	52.7	24,980	730
1928					
January	14,862	20,140	58.5	21,941	887
February	15,291	18,670	55.4	20,848	813
March	17,069	20,680	57.9	19,558	879
April	15,393	19,280	58.8	19,283	810
May	18,945	20,215	54.1	18,137	889
June	18,781	18,140	48.2	18,709	350
July	17,278	19,070	51.0	17,305	986
August	19,049	17,890	41.7	15,881	909
September	18,693	17,795	44.2	17,991	809
October	17,182	18,420	45.1	17,026	842
November	18,245	18,380	49.1	22,399	730
December	17,728	14,320	45.9	24,785	673
1929					
January	18,685	21,068	49.1	24,394	941
February	18,094	19,829	47.7	23,305	1,028
March	19,984	20,867	46.7	22,076	1,344
April	19,899	22,435	47.3	20,680	1,498
May	20,385	23,176	47.1	19,479	1,299
June	18,416	18,141	42.0	17,980	961
July	18,387	20,236	48.7	19,679	1,202
August	19,787	18,230	47.6	22,309	860
September	18,660	16,416	47.2	24,984	657
October	18,698	18,024	51.8	25,474	830
November	14,363	14,742	53.4	26,080	1,232

*Stocks on hand the last of the month or year.
Compiled by Rubber Manufacturers Association.

Auto Tire	Spec. Grav.	Price Per Pound
Black	1.21	.07 @ .07½
Black selected tires....	1.18	.07½ @ .07½
Dark gray	1.35	.09 @ .09½
Light gray	1.38	.10 @ .10½
White	1.40	.11½ @ .12

Shoe	Spec. Grav.	Price Per Pound
Unwashed	1.60	.07 @ .07½
Washed	1.50	.09½ @ .10

Tube	Spec. Grav.	Price Per Pound
No. 1	1.00	.12½ @ .13
No. 2	1.10	.09½ @ .10

Truck Tire	Spec. Grav.	Price Per Pound
Truck tire, heavy gravity	1.55	.06½ @ .07
Truck tire, light gravity	1.40	.07½ @ .07½

Miscellaneous	Spec. Grav.	Price Per Pound
Red	1.35	.11 @ .11½
Mechanical blends....	1.60	.06 @ .06½

Gastex

Gastex, a new reenforcing carbon for rubber compounding, is now being manufactured under improved facilities of well-known uniform quality. Systematic tests carried out during recent months show this material to be a very desirable pigment for compounding such rubber stocks as those used in footwear, solid tires, extruded products, and as a partial replacement in pneumatic tire tread stocks.

November Imports

Imports of crude rubber of all classes into the United States during November totaled 40,621 long tons according to estimates by The Rubber Manufacturers Association. This compares with imports of 43,725 long tons in October and with 34,720 long tons in November, 1928. For the eleven months ended November 30 total imports of crude rubber are estimated at 517,912 long tons as against imports of 399,581 long tons for the corresponding period last year.

Canadian Rubber Consumption, 1928

The annual report of the Dominion Bureau of Statistics on the Canadian rubber industry shows that during 1928 the consumption of crude rubber was 30,049 long tons, and the consumption of reclaimed rubber 11,808 long tons, or 39.3 per cent as much reclaimed rubber as of crude rubber. This ratio for reclaim is the highest yet reported for the Canadian industry, and is particularly striking because of the fact that it occurred during a year when the price of rubber was relatively low. Possibly the very large increase in 1929 consumption of crude rubber in Canada is to some extent caused by partial replacement of reclaims by crude rubber.

Year	Crude Long Tons	Reclaimed Long Tons	Ratio Per Cent
1923	13,927	3,065	22.0
1924	13,783	3,625	26.3
1925	19,030	5,415	28.5
1926	19,209	7,308	38.0
1927	25,700	9,217	35.8
1928	30,049	11,808	39.3

RUBBER SCRAP

RUBBER scrap demand in December was steady and dull with prices declining on all types but not on all grades. The more marked decline in quotations occurred in mixed auto tires, with and without beads, motor truck tires, and air brake hose. Export demand was fair to good. Reclaimers are well supplied with tires and are not interested in other scrap grades.

BOOTS AND SHOES. Stocks are quiet and in fair demand only.

INNER TUBES. No. 1, floating grade is in good demand and scanty supply. No. 2, compounded tubes are in only fair demand at $\frac{1}{4}$ -cent below the price of a month ago. Red tubes have dropped $\frac{1}{4}$ -cent and are in good export request. Mixed tubes are steady at a decline of $\frac{1}{2}$ -cent from the November price.

TIRES. Mixed auto tires are quoted at \$18, which is \$3 less than last month. There are large accumulations in reclaimers' yards, and demand is small in consequence. Beadless tires are quoted \$27.50, down \$2.50. Other pneumatic tire grades are unchanged and scarce. Mixed motor truck tires are active. The current quotation is unchanged from last month except it shows 50 cents less spread in the range.

MECHANICALS. These grades are all dull and unchanged except air brake hose which is quoted \$2 less than a month ago.

HARD RUBBER. No. 1 hard rubber is dull and has declined $1\frac{1}{2}$ cents.

CONSUMERS' BUYING PRICES

Carload Lots

December 26, 1929

Boots and Shoes

	Prices
Boots and shoes, black....lb.	\$1.20 @ \$1.35
Untrimmed arctics.....lb.	.0034 @ .01
Tennis shoes and soles....lb.	.0034 @

Inner Tubes

No. 1, floating.....lb.	0.07 $\frac{1}{4}$ @ 0.07 $\frac{1}{2}$
No. 2, compounded.....lb.	.03 $\frac{3}{4}$ @ .03 $\frac{1}{2}$
Red.....lb.	.04 $\frac{1}{4}$ @ .04 $\frac{1}{2}$
Mixed tubes.....lb.	.03 $\frac{1}{4}$ @ .03 $\frac{3}{4}$

Tires

Pneumatic Standard—		
Mixed auto tires with beads.....ton	18.00	@ 18.50
Beadless.....ton	27.50	@ 28.00
White auto tires with beads.....ton	40.00	@ 42.00
Beadless.....ton	48.00	@ 49.00
Mixed auto peeling.....ton	30.00	@ 31.00
Solid—		
Mixed motor truck, clean.....ton	22.00	@ 22.50

Mechanicals

Mixed black scrap.....lb.	.00 $\frac{1}{2}$ @ .00 $\frac{3}{4}$
Hose, air brake.....ton	21.00 @ 21.50
regular soft.....lb.	.00 $\frac{3}{4}$ @
No. 1 red.....lb.	.02 @ .02 $\frac{1}{4}$
No. 2 red.....lb.	.01 @ .01 $\frac{1}{4}$
White druggists' sundries.....lb.	.02 @ .02 $\frac{1}{4}$
Mechanical.....lb.	.01 $\frac{1}{2}$ @ .01 $\frac{3}{4}$

Hard Rubber

No. 1 hard rubber.....lb.	.08 $\frac{1}{2}$ @ .09 $\frac{1}{2}$
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English Rubber Scrap Market

(By Cable)

CONSUMERS' BUYING PRICES

London, December 23, 1929.

	£ per Ton
Galoshes.....	£4 @ £5
Prime ebomite.....	30 @ 35
Motor tires.....	3 @ 3 $\frac{1}{2}$
Floating motor tubes.....	30 @ 35
Red motor tubes.....	16 @ 18

Market reported dull.



Patent Suits

VULCANIZING PRESS. No 1,100,934, J. K. Williams, Vulcanizing press, filed Sept. 24, 1929, D. C., N. D. Ohio (E. Div.), Doc. 3128, National-Erie Co. v. Southwork Foundry & Machine Co. *Official Gazette*, Vol. 388, No. 4, p. 786.

TIRE CORE. No. 1,566,014, F. L. Johnson, Collapsible tire core; 1,618,153, same, Collapsible tire-building forms, D. C., N. D. Ohio (E. Div.), Doc. 2662, F. L. Johnson et al. v. The Bridgewater Machine Co. Patents held valid and infringed Sept. 13, 1929. *Official Gazette*, Vol. 389, No. 1, p. 8.

Trade Marks Canceled

TIRES AND TUBES. No. 241,051. Vehicle tires and inner tubes therefor. The Firestone Tire & Rubber Co., Akron, O. Registered April 17, 1928. Canceled October 30, 1929. *Official Gazette*, Vol. 388, No. 4, p. 779.

Treasury Decisions

BALLS. No. 10206. Protest 266028-G of Geo. Borgfeldt & Co. (Galveston). Merchandise classified as toys at 70 per cent ad valorem under paragraph 1414, tariff act of 1922, is claimed dutiable at 35 per cent under paragraph 1313, or at 30 per cent under paragraph 1402.

Opinion by J. Sullivan. In accordance with stipulation of counsel paper hats were held dutiable at 35 per cent under paragraph 1313 on the authority of Abstracts 7336 and 7428, and india rubber balls at 30 per cent under paragraph 1402, United States v. Woolworth (16 Ct. Cust. Appls. 421, T. D. 43136) followed. *Official Gazette*, Vol. 56, No. 21, p. 27.

Expositions in Belgium

Two international expositions and various conferences will take place in Belgium in 1930. The exhibition at Antwerp will cover principally maritime and colonial matters and it seems that the colonial section promises to be particularly fine for its kind. A chemical exposition will be held at Liege at the Palais de la Chimie, and already a large number of Belgian and foreign participants have applied for space. During the exposition at Liege, the tenth congress for industrial chemistry will be held.

Industry and Trade

Report of the National Industrial Conference Board

REPORTS of conditions in basic industries throughout the country indicated some falling off in November from October levels and not infrequently lower levels than in November a year ago. There is evidence throughout that without stopping, business has hesitated. The degree of hesitation indicated by the figures is far less than the alarmists would have led the public to expect, and there are strong factors in the present situation which seem to promise an early recovery from uncertainty and hesitation.

Automobiles

Sharp curtailment of motor vehicle production in November to an output of 226,887 units has tended to prevent a further increase in inventories of new automobiles. November declined 42.5 per cent under October and 15.5 per cent under November last year. New registrations of passenger cars in October were 5 per cent lower than September but 1.4 per cent higher than October last year. Truck registrations in October, on the other hand, showed an increase of 7 per cent over September and 22 per cent over October, 1928. New registrations during the first ten months this year were larger than the full year 1928—422,835 increase for passenger cars, and 128,568 gain for trucks.

Foreign sales in October were slightly lower than September and 18 per cent under October last year. Sales abroad in the first ten months this year showed a gain of 15 per cent for passenger cars and 82 per cent for trucks compared with foreign sales for the corresponding months last year.

Rubber

Estimated consumption of crude rubber of all classes by United States manufacturers in November was 20.5 per cent less than in October and 26.2 per cent less than in November, 1928. For the first eleven months of this year estimated consumption was 8.8 per cent greater than in the same months of 1928. November imports of crude rubber were estimated at 7.1 per cent less than in October and 17.0 per cent more than in November, 1928. For the first eleven months of 1929 estimates of imports were 29.6 per cent greater than in the same period a year ago. Estimated domestic stocks on November 30 were 4.2 per cent greater than on October 31. Production of pneumatic casings for the first ten months of this year showed a very slight increase of 0.3 per cent over the same period a year ago. Shipments for the same period exceed production by approximately 1.0 per cent.

January 1, 1930

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COMPOUNDING INGREDIENTS

THE production of tires and tubes in the Akron and other rubber manufacturing centers has proceeded at a subnormal rate for several weeks past owing to the reduction of automobile production. The tire companies placed their requirements during December for compounding materials with the view of resuming tire output early in January on capacity basis. This has resulted in a heavy movement of supplies.

Factories are said to have on hand orders for spring dating in excess of those on hand one year ago. Also it is thought that tire production in 1930 will progress with more uniformity in rate of output than last year, in other words, with less excessive peaks of output rate.

Some mechanical rubber goods plants operated in December at 80 per cent of capacity. Rubber footwear plants are now active at something like capacity. Stocks in retailers' hands are reported to be less excessive than some weeks ago and before the advent of winter snows, rain, and mud. Automobile topping is correspondingly slack with car production, but is due for a rapid revival with the opening of the new year.

ACCELERATORS. The function of accelerators is so essential for quality and quantity production in all lines of rubber goods that the demand is steadily set to high levels and well maintained by reason of the spur of competition between manufacturers.

AGE RESISTERS. These materials are in well sustained demand. In this group are included certain accelerators capable of performing double duty as both accelerator and antioxidant, materials of plain antioxidant effect and others of preservative value toward the rubber as obviating sun-cracking, etc.

Each of these materials has its established field of usefulness and is in steadily growing demand by progressive compounders.

BENZOL. The price trend has been irregular. Good export demand early in the month was succeeded by unsettled and quiet trade conditions.

CARBON BLACK. Prices have been unsettled with less consuming demand. About the middle of December prices were reduced to 6 cents f. o. b. Texas works and

6.1 cents Louisiana works, representing a reduction of 2½ cents a pound.

CLAY. Rubber compounding clays are in the usual steady demand, if not at peak tonnages.

LITHARGE. Trading has slowed down to routine demand with prices steady.

LITHOPONE. The price is steady at 8¾ cents. Consuming demand is reported improving.

MINERAL RUBBER. This standby of rubber workers generally is in heavy routine demand at basic prices.

SOFTENERS. The many types and kinds of material offer wide selection adapted to every compounding need at moderate and steady prices.

TITANIUM PIGMENTS. These materials are relatively new with rubber compounders but are specially valuable for white rubber goods. On December 2 they became available at prices competitive with lithopone.

V. M. P. NAPHTHA. The demand holds steadily routine, and the price firm.

STEARIC ACID. Demand is routine with price weaker but unchanged.

ZINC OXIDE. The price holds unchanged although metallic zinc fell 25 points early in December. The demand from the rubber trade is routine.

Accelerators, Inorganic

Lead, carbonate.....lb.	\$0.09 @	
Lead, red.....lb.	.09 3/4 @	
sublimed white.....lb.	.08 1/2 @	
sublimed blue.....lb.	.08 1/2 @	
super-sublimed white.....lb.	.08 1/2 @	
Lime, R. M. hydrated.....ton	20.00 @	
Litharge.....lb.	.08 3/4 @	
Magnesia, calcined heavy.....ton	80.00 @	
carbonate.....lb.	.08 3/4 @	.11
Orange mineral A.A.A.....lb.	.11 3/4 @	

Accelerators, Organic

A-7.....lb.	.55 @	.65
A-11.....lb.	.62 @	.75
A-16.....lb.	.57 @	.65
A-19.....lb.	.58 @	.75
A-20.....lb.	.64 @	.80
A-32.....lb.	.80 @	.95
Aldehyde ammonia.....lb.	.65 @	.70
Butene.....lb.	@	
Captax.....lb.	@	
Crylene.....lb.	@	
paste.....lb.	@	
D. B. A.....lb.	@	
D. O. T. G.....lb.	.42 @	.47
D. P. G.....lb.	.30 @	.35
Ethylidineaniline.....lb.	.45 @	.47 1/2
Formaldehydeaniline.....lb.	.37 1/2 @	.42 1/2
Grasselerator 102.....lb.	@	
552.....lb.	@	
808.....lb.	@	
833.....lb.	@	
Heptene.....lb.	@	
base.....lb.	@	
Hexamethylenetetramine.....lb.	.58 1/2 @	.61
Lead oleate, No. 999.....lb.	.15 3/4 @	
Witco.....lb.	.14 @	
Lithex.....lb.	@	
Methylenedianiline.....lb.	.37 1/2 @	.40
Monex.....lb.	@	
Phenex.....lb.	.75 @	
Plastone.....lb.	@	
R-2.....lb.	2.00 @	2.50
R. & H. 40.....lb.	.40 @	.42 1/2
50.....lb.	.40 @	.42 1/2
Safex.....lb.	@	
S.P.D-X.....lb.	.75 @	
Tensilac No. 39.....lb.	.40 @	.42 1/2
No. 41.....lb.	@	
Thermlo F.....lb.	.50 @	.55
Thiocarbamilid.....lb.	.25 1/2 @	.28 1/2
Trimene.....lb.	@	
base.....lb.	@	
Tuads.....lb.	@	
V. G. B.....lb.	@	
Waxene.....lb.	.30 @	.40
Z. B. X.....lb.	@	
Z-88.....lb.	.50 @	.60
Zimate.....lb.	@	

Acids

Acetic 28% (bbils.).....100 lbs.	3.88 @	4.13
glacial (carbonyl).....100 lbs.	14.18 @	14.43
Sulphuric, 66%.....ton	15.50 @	

New York Quotations

December 26, 1929

Alkalies

Caustic soda, solid.....100 lb.	\$2.90 @	
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Antioxidants

Age-Rite, powdered.....lb.	@	
resin.....lb.	@	
white.....lb.	@	
Albasan.....lb.	@	
Antox.....lb.	@	
Grasselerator A.....lb.	@	
Resistox.....lb.	.54 @	.65
Stabilite.....lb.	.57 @	.62
Stabilite-Albia.....lb.	.70 @	.75
Sunproof.....lb.	@	

Colors

BLACK

Bone.....lb.	.09 1/2 @	
Carbon (see compounding ingredients).....lb.	@	
Drop (bbils.).....lb.	.05 1/2 @	.15
Lampblack (commercial).....lb.	.07 @	.08

BLUE

Akco blue.....lb.	@	
Huber, brilliant.....lb.	3.50 @	4.00
Prussian.....lb.	.35 @	.37
Ultramarine.....lb.	.06 @	.30

BROWN

Huber morcha.....lb.	1.60 @	2.10
Sienna, Italian, raw.....lb.	.05 1/2 @	.12 1/2

GREEN

Akco green.....lb.	@	
Chrome, light.....lb.	.27 @	.31
medium.....lb.	.28 @	.31
Chromium oxide.....lb.	.33 @	.38
Huber brilliant.....lb.	3.75 @	4.25

ORANGE

Huber Persian.....lb.	.50 @	1.00
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RED

Akco red.....lb.	@	
Antimony.....lb.	@	
Crimson, 15/17%.....lb.	@	
Sulphur free.....lb.	@	
Crimson, R. M. P. No. 3.....lb.	.48 @	
Sulphur, free.....lb.	.52 @	
Vermilion, No. 5.....lb.	@	
No. 15.....lb.	@	
Golden.....lb.	@	
No. 60.....lb.	@	
15/17%.....lb.	@	
7-A.....lb.	.35 @	
Z-2.....lb.	.22 @	

RED (Continued)

Aristi.....lb.	@	
Huber brilliant.....lb.	\$1.35 @	\$1.85
Iron Oxides.....lb.	@	
bright pure domestic.....lb.	.11 @	
bright pure English.....lb.	.14 @	
bright reduced English.....lb.	.10 @	.11
bright reduced domestic.....lb.	.10 @	
Indian (maroon), pure.....lb.	.11 @	
domestic.....lb.	.11 @	
English (maroon), pure.....lb.	.11 @	.12
Indian (maroon) reduced.....lb.	.09 1/2 @	
English.....lb.	@	
Indian (maroon) reduced.....lb.	.08 @	
Oximony.....lb.	.13 1/2 @	
Spanish red oxide.....lb.	.02 1/2 @	.04
Sunburnt red.....lb.	.14 @	
Venetian red.....lb.	.02 @	.06

WHITE

Lithopone.....lb.	.05 1/2 @	.05 3/4
Albalith.....lb.	@	
Azolith.....lb.	.05 1/2 @	.05 3/4
Grasselli.....lb.	.05 1/2 @	.05 3/4
Sterling.....lb.	@	
Titanium oxide, pure.....lb.	.22 @	.23
Titanox "B".....lb.	.07 1/4 @	.07 3/4
Titanox "C".....lb.	.07 3/4 @	.08 1/4
Zinc Oxide.....lb.	@	
AAA (lead free) (bbils.).....lb.	.07 @	
Azo (factory).....lb.	@	
ZZZ (lead free).....lb.	.06 1/2 @	.07
ZZ (lead).....lb.	.06 3/4 @	.06 1/2
Z (8% lead).....lb.	.06 1/4 @	.06 3/4
Green seal.....lb.	@	
Kadox.....lb.	@	
Red seal.....lb.	@	
Special.....lb.	@	
White seal.....lb.	@	
XX green label.....lb.	@	
XX red label.....lb.	@	

YELLOW

Akco yellow.....lb.	@	
Cadmium sulphide.....lb.	1.00 @	1.40
Chrome.....lb.	.17 @	.17 1/2
Grasselli cadmium.....lb.	2.86 @	3.30
Huber cadmy.....lb.	.01 1/2 @	.02 1/2
Ochre, domestic.....lb.	.03 @	
French.....lb.	.03 @	
Oxide, pure.....lb.	.09 @	
Zinc, C. P., imported.....lb.	.21 @	

Compounding Ingredients

Aluminum flake (sacks, c.l.).....ton	21.85 @	
(sacks l.c.l.).....ton	24.50 @	
Ammonium carb. p.wd.....lb.	10 1/2 @	
lump.....lb.	.10 @	
Asbestine.....ton	25.00 @	
Barium carbonate.....ton	57.00 @	62.00
Baryta white (f.o.b. St Louis, bbils.).....ton	23.00 @	

Compounding Ingredients (Continued)

Baryta white (f.o.b. St. Louis, paper bags).....	ton	\$22.20	@
Barytes, pure white.....	ton	35.00	@
off color.....	ton	25.00	@
medium.....	ton	30.00	@
Foam "A" (f.o.b. St. Louis, bbls.).....	ton	23.00	@
Foam "A" (f.o.b. St. Louis, bags).....	ton	23.00	@
Basofor.....	lb.	.04½	@
Blanc fixe, dry.....	lb.	.04½	@
pulp.....	ton	42.50	@45.00
Carbon Black			
Acrlfited arrow.....	lb.	.07	@ .11
Century (works, La., c.l.).....	lb.	6.10	@
Compressed.....	lb.	.06½	@ .12
Disperso (works, La., c.l.).....	lb.	6.10	@
Fumonex.....	lb.	.04½	@ .08
Gastex (f.o.b. fact'y) contracts.....	lb.	.04½	@
carload.....	lb.	.05½	@
less carload.....	lb.	.07½	@
Micronex.....	lb.	.07	@ .12
Uncompressed.....	lb.	.06½	@ .11
Velvetex.....	lb.	.04	@ .06
Carrara filler.....	ton		@
Chalk.....	ton	12.00	@
Clay, Blue Ridge, dark.....	ton		@
Blue Ridge, light.....	ton		@
China.....	ton	.01½	@
Dixie.....	ton		@
Langford.....	ton		@
Mineral flour (Florida).....	ton		@
Perfection.....	ton	25.00	@
Suprex.....	ton	8.00	@20.00
Cotton flock, black.....	lb.	.13	@
light-colored.....	lb.	.10	@ .11
white.....	lb.	.12	@ .30
Glue, high grade.....	lb.	.25	@ .35
low grade.....	lb.	.15	@ .23
Infusorial earth.....	ton	45.00	@
Mica amber.....	lb.	.04½	@
Neomerpin, S. A. conc.....	lb.	.60	@
Pumice stone, p.wd.....	lb.	.02½	@ .04
Rottenstone, domestic.....	ton	23.50	@28.00
Shellac, fine orange.....	lb.		@
Soapbark (cut).....	lb.	.12	@ .12½
Soapstone.....	ton	15.00	@22.00
Talc, domestic.....	lb.	.01½	@
French.....	ton	18.00	@22.00
Pyrex A.....	ton		@
B.....	ton		@
Thermatomic carbon.....	lb.		@
Whiting			
Domestic.....	100 lbs.	1.00	@
English, cliffstone.....	100 lbs.	1.50	@
Imported chalk.....	100 lbs.	.90	@ 1.00
Paris White, English cliffstone.....	100 lbs.	1.50	@ 3.00
Quaker.....	ton		@
Slate flour, gray (fact'y).....	ton	7.00	@
Snow white.....	ton		@
Sussex.....	ton		@
Vancolloid.....	ton		@

New York Quotations

December 26, 1929

Compounding Ingredients—(Continued)

Westminster Brand.....	100 lbs.	@
Witco (l. c. l.).....		@
(f.o.b. New York).....	ton	\$20.00 @

Factice—See Rubber Substitutes

Mineral Rubber

Fluxrite (solid).....	lb.	@
Genasco (fact'y).....	ton	50.00 @ 52.00
Gilsonite (fact'y).....	ton	37.14 @ 39.65
Granulated M. R.....	ton	@
Hydrocarbon, hard.....	ton	@
Hydrocarbon, soft.....	ton	@
Ohmlac Kapak, M. R. (f.o.b. fact'y).....	ton	60.00 @
M. 4 (f.o.b. fact'y).....	ton	175.00 @
Parafura (fact'y).....	ton	62.50 @ 65.00
Pioneer, M. R., solid fact'y.....	ton	40.00 @ 42.00
M. R. granulated.....	ton	50.00 @ 52.00
Robertson, M. R., solid (fact'y).....	ton	34.00 @ 80.00
M. R. granulated.....	ton	38.00 @ 80.00

Oils

Kerosene.....	gal.	.15 @
Mineral.....	gal.	.20 @
Poppy seed oil.....	gal.	1.70 @
Rapeseed.....	gal.	.80 @
Red oil, distilled.....	lb.	.10½ @ .11½
Rubber process.....	gal.	.25 @
Spindle.....	gal.	.30 @

Rubber Substitutes or Factice

Black.....	lb.	.08 @ .14
Brown.....	lb.	.08 @ .15
White.....	lb.	.09 @ .16

Softeners

Burgundy pitch.....	100 lbs.	5.00 @ 6.50
Atlas.....	100 lbs.	6.00 @
Corn oil, crude.....	lb.	.10½ @
Cottonseed.....	lb.	.10½ @
Cycline oil.....	gal.	.26 @ .34
Degras.....	lb.	.03½ @ .04½
Fluxrite (fluid).....	lb.	@
Moldrite.....	lb.	@
Palm oil (Lagos).....	lb.	.10 @
Palm oil (Niger).....	lb.	.09½ @
Palm oil (Witco).....	lb.	.08½ @
Para-flux.....	gal.	.17 @
Petrolatum, snow white.....	lb.	.08½ @ .08½
Pigmentar.....	lb.	.02½ @ .03
Pigmentaroil (tank cars, factory).....	gal.	.26 @
(bbls., drums).....	gal.	.26 @
Pine oil, dest distilled.....	gal.	.55 @ .56
Pine tar (retort).....	drum	14.75 @
Rosin K (bbls.).....	280 lbs.	9.45 @

Softeners (Continued)

Rosin oil compounded.....	gal.	\$0.30 @
No. 3, deodorized.....	gal.	.58 @
No. 556, deodorized.....	gal.	.49 @
Rubber seed, drums.....	lb.	.09½ @
Rubback.....	lb.	.11 @
Stearax.....	lb.	.15 @ .20
Stearic acid, double pressed.....	lb.	.15½ @ .16½
Tackol.....	lb.	@
Witco No. 20.....	gal.	.17 @
Woburn oil.....	lb.	.05½ @ .06

Solvents

Benzol (90% drums).....	gal.	.28 @
Carbon bisulphide (drums).....	lb.	.05½ @ .11
tetrachloride (drums).....	lb.	.06½ @ .07
Cyclohexanone methyl.....	lb.	.60 @
Dip-Sol.....	gal.	.13 @
Dryolene, No. 9.....	gal.	.10 @
Gasoline		
No. 303		
Drums, c. l.	gal.	.20 @
Drums, l. c. l.	gal.	@
Tankcars.....	gal.	.16 @
Hexalin.....	lb.	.60 @
Rub-Sol.....	gal.	.09 @
Solvent naphtha.....	gal.	.35 @
Stod-Sol.....	gal.	.10 @
Turpentine, Venice.....	lb.	.20 @
dest distilled.....	gal.	.40 @ .43

Vulcanizing Ingredients

Sulphur		
Velvet flour (240 lb. bbls.).....	100 lbs.	2.95 @ 3.50
(150 lb. bags).....	100 lbs.	2.60 @ 3.15
Soft rubber (c.l.).....	100 lbs.	@
(l.c.l.).....	100 lbs.	@
Superfine commercial flour (bbls.).....	100 lbs.	2.25 @ 3.10
(bags).....	100 lbs.	2.20 @ 2.80
Tire brand, superfine, 100 lbs.....	100 lbs.	1.90 @ 2.25
Tube brand, velvet, 100 lbs.....	100 lbs.	2.40 @ 2.75
Sulphur chloride.....	lb.	.03½ @ .04
Vandex (selenium).....	lb.	@
(See also Colors—Antimony)		

Waxes

Beeswax, white, com.....	lb.	.50 @ .55
carnauba.....	lb.	.36 @ .37
ceresine, white.....	lb.	.10 @ .11
montan.....	lb.	.06 @ .06½
ozokerite, black.....	lb.	.21 @ .22
green.....	lb.	.23 @ .24

Paraffin

122/124 crude, white scale.....	lb.	.03½ @
124/126 crude, white scale.....	lb.	.03½ @
123/125 full refined.....	lb.	.04 @
125/127 fully refined.....	lb.	.04½ @

Ceylon Rubber Exports

January 1 to August 31, 1929

To United Kingdom.....	tons	11,293.36
Continent.....		4,949.14
Australia.....		2,217.12
America.....		30,492.22
Egypt.....		6.00
Africa.....		6.05
India.....		37.53
China.....		2.00
Japan.....		212.68
Other countries in Asia.....		7.07
Total.....		49,218.17
For the same period last year.....		32,491.67

January 1 to September 30, 1929

To United Kingdom.....	tons	13,372.75
Continent.....		5,812.52
Australia.....		2,465.69
America.....		35,259.69
Egypt.....		7.00
Africa.....		6.56
India.....		50.92
China.....		2.00
Japan.....		272.44
Other countries in Asia.....		7.32
Total.....		57,256.89
For the same period last year.....		37,169.69

Annual Exports, 1921-1928

For the year.....	tons	
1928.....		57,825.48
1927.....		55,355.77
1926.....		58,799.56
1925.....		45,697.19
1924.....		37,351.13
1923.....		37,111.88
1922.....		47,367.14
1921.....		40,210.31

Rubber Lessens Coke Waste

Gas works in England note that a considerable saving is being effected through having the plates of coke chutes rubber-faced by a process which insures a perfect bond of rubber to metal. Instead of acting as an abrasive, it is stated, the coke bounces on the rubber with the result that breakage of the coke is thus minimized and the production of breeze or waste screenings is greatly reduced. Rubber conveyer belts are also proving much more economical and efficient than leather belts, and rubber is being applied with much advantage for packings and lining bearings where grit has hitherto been very troublesome.

A Correction

In the article published in our September issue on, "The Manufacture of Gem Duck Coating," by Morris M. Danovitch, line 5 in the third paragraph on page 63 should read, "chemically gutta percha consists of a combination of hydrocarbons."

Automobile Production

November production (factory sales) of motor vehicles in the United States, as reported to the Department of Commerce, was 217,441, of which 169,309 were passenger cars, 46,513 trucks, and 1,619 taxicabs, as compared with 398,011 passenger cars, trucks, and taxicabs in October and 257,140 in November, 1928.

January 1, 1930

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COTTON AND FABRICS

American Cotton

THE spot price of middling American cotton on December 2 was 17.30 cents compared to 18.10 cents on the first day of the preceding month, and 19.15 cents on October 1. The range between December 2 and December 22 was 0.55 cents. The high for that period being 17.55 on the third and the low 17.07 on the twentieth.

Concerning the price range the *Textile World* says, "The question of price levels is expected to depend, as far as the lower level of the range is concerned, on the southern spot markets, while the upper end of the range is expected to be determined by the development of trade. The theory behind this is that the attitude of the Federal Farm Board with reference to loan values has practically pegged the price around the 16½- to 17½-cent levels, and that the extent of advances will depend upon the urgency and volume of the demand."

A total production of cotton in the United States for the 1929 season was estimated by the Federal Crop Reporting Board at 14,919,000 bales, against an estimate of 15,009,000 bales a month ago, and a harvest of 14,478,000 bales last year.

The report of conditions on December 1, the last estimate from the Board for the season, was closely in line with general expectations.

Commenting on it, Geo. H. McFadden & Bro. states, "Allowing for the difference in weight between running bales and 500-pound bales, the production is probably about 14,750,000 bales plus a city crop of 250,000 bales, making a total of about 15,000,000 bales, to which should be added the carry-over from last year of 4,474,000 bales, giving a supply of 19,474,000 bales compared with 19,671,000 bales last year. Consumption is now estimated at about 14,900,000 bales so that the indications suggest a slight increase in the carry-over next August."

There is more cotton in the United States today than there was a year ago at this time. The reason is that over 300,000 bales more had been ginned to December 13, while exports to November 29 were 300,000 bales smaller; and consumption for the four months ending with November was but slightly above the same period last year.

In comment, Harriss & Vose declares, "This is the statistical evidence of the rapid movement, and the relative slowness

of foreign countries in covering their requirements, which in conjunction with the stock market decline have put cotton down. These figures had an undeniable influence in the past two months, but if they are projected forward, their bearishness disappears. The total amount by which this year's crop exceeds last year's has now come into sight, been hedged, and had its effect on the market. Hereafter the movement will be no heavier than the corresponding period of last year, when the price in New York was around 20 cents. Nor does the fact that exports thus far have fallen behind possess any bearishness for the future. The fact is that exports at this time last year, with which comparisons are made, were running at a higher rate than the year's needs of foreign mills called for, as was conclusively demonstrated by the sharp falling off that occurred in the last few months of the season."

Dr. Lewis H. Haney, director, New York University Business Research Bureau, summarizes conditions in the *Textile World*. "Supply is ample; while demand is declining. While the price of cotton may recover a little early next year, the average for the season is likely to be under 18 cents at New York. It is fairly obvious that the unfavorable factors predominate and that the average for the sea-

Drills

38-inch 2.00-yard	yard	\$0.16½ @
40-inch 3.47-yard .....		.09½ @
50-inch 1.52-yard .....		.22½ @
52-inch 1.90-yard .....		.18½ @
52-inch 2.20-yard .....		.16½ @
59-inch 1.85-yard .....		.19½ @

Ducks

38-inch 2.00-yard D. F.	yard	.17 @
40-inch 1.45-yard S. F. ....		.23½ @
72-inch 1.05-yard D. F. ....		.35 @
72-inch 16.66-ounce38 @
72-inch 17.21-ounce39½ @

MECHANICAL

Hose and belting	pound	.35 @
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TENNIS

52-inch 1.35 yard	yard	.24½ @
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Hollands

R.T. 5-30-inch	yard	.16 @
R.T. 7-36-inch18 @
R.T. 8-40-inch20 @
48A-32-inch12½ @
48A-40-inch15½ @

RED SEAL

36-inch	yard	.14½ @
40-inch .....		.15½ @
50-inch .....		.22½ @

GOLD SEAL

40-inch, No. 72	yard	.19¾ @
40-inch, No. 80 .....		.20¾ @

New York Quotations

December 26, 1929

Osnaburgs

40-inch 2.35-yard	yard	\$0.13¾ @
40-inch 2.48-yard .....		.13 @
40-inch 3.00-yard .....		.10½ @
40-inch 10-oz. part waste ..	lb.	.17½ @
40-inch 7-oz.	lb.	.12 @
37-inch 2.42-yard	yard	.13¾ @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yard	.11 @
Bombazine 60 x 48 .....		.10 @
Plaids 60 x 48 .....		.12½ @
Plaids 48 x 48 .....		.11¾ @
Surface prints 64 x 60 .....		.13½ @
Surface prints 60 x 48 .....		.12½ @
Print cloth, 38½-in., 60 x 48		.06¾ @
Print cloth, 38½-in., 64 x 60		.07¾ @

Sheetings, 40-inch

48 x 48, 2.50-yard	yard	.11¾ @	.12
48 x 48, 2.85-yard .....		.10 @	.10¾
64 x 68, 3.15-yard .....		.10½ @	
56 x 60, 3.60-yard .....		.09 @	
44 x 48, 3.75-yard .....		.08½ @	.08½
44 x 40, 4.25-yard .....		.07¾ @	.07¾

Sheetings, 36-inch

48 x 48, 5.00-yard	yard	.06¾ @	.06½
44 x 40, 6.15-yard05¾ @	.05¾

Tire Fabrics

SQUARE WOVEN 17½-ounce

Peeler, karded	pound	\$0.46 @
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BUILDER 23/11

Peeler, karded	pound	.46 @
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BUILDER 10/5

Peeler, karded	pound	.43 @
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CORD 23/3/3

Peeler, karded, 1½-in.	pound	.46 @
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CORD 23/4/3

Peeler, karded	pound	.48 @
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CORD 23/3/3

Peeler, karded	pound	.51 @
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CORD 15/3/3

Peeler, karded	pound	.44 @
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CORD 13/3/3

Peeler, karded	pound	.43 @
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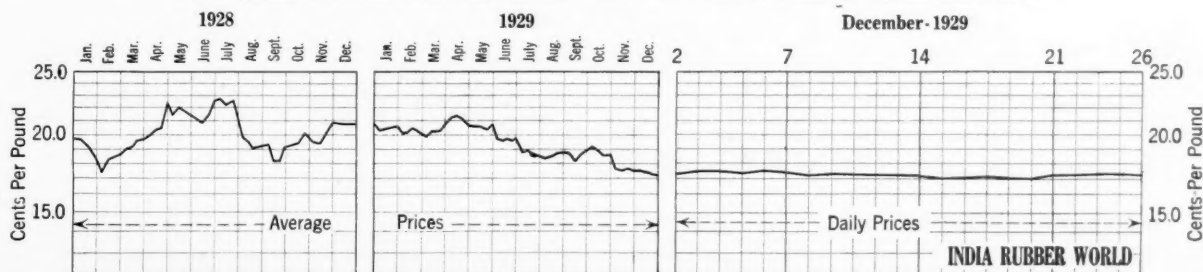
LENO BREAKER

8-oz. Peeler, karded	pound	.46 @
10-oz. Peeler, karded46 @

CHAFER

9.5-oz. Peeler, karded	pound	.48 @
12-oz. Peeler, karded .....		.47 @
14-oz. Peeler, karded .....		.46 @

New York Cotton Exchange Daily Prices of Spot Middling Upland Cotton



son will be considerably lower than in the last two years. The supply situation however is sufficiently strong to indicate that the prices will average above the 1926-27 level (14.75 cents)."

At a conference between members of the Federal Farm Board and directors of co-operatives and growers associations in the Cotton Belt States on December 12, a decision was reached to create a centralized marketing organization to finance the handling of cotton in fifteen southern and western states. As approved by the conference held, the agency will come into existence through transforming of the American Cotton Growers Exchange, now operating as a mutual cooperative, non-profit organization. The new corporation will have authorized capital stock of \$30,000,000, which will be open to subscription on the part of any cooperative marketing association whose form of organization satisfies the directors of the corporation. With the support of the Farm Board the organization contemplates a loan fund for its stockholder members to finance the movement of crops or "any proper activity necessary to the free delivery, handling or marketing of cotton or cotton seed or their products."

Carl Williams, cotton member of the Farm Board, said the corporation would have charge of the 1930 crop and that if the cotton farmers do their part in

cooperative marketing, it means the beginning of progress that has unlimited possibilities for the benefit of the men who grow cotton and everyone else who deals with them.

On December 24, spot cotton was 17.25 cents, unchanged from the day previous.

Weekly Average Prices of Middling Cotton

Week Ended	Cents Per Pound
Nov. 30	17.40
Dec. 7	17.43
Dec. 14	17.26
Dec. 20	17.07

Egyptian Cotton

The market on all staple cottons has been quiet and uninteresting during the past month. Holders of American staples grading Middling and better are not anxious to sell except at very full prices. A belief is growing that the shorter staples will be exceedingly scarce later in the season.

In Egypt the market remains practically at the minimum prices fixed by the Egyptian Government, which has already taken up a fair amount of cotton in accordance with its plan to support prices. Sakels, particularly new crop, have been easy, influenced no doubt by the prospect of a material increase in the Sudan crop of this year.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The current market prices on these goods are substantially reduced from those prevailing a month ago. Consuming demand has distinctly improved, but not sufficiently to advance production to capacity. The strength of the situation lies in the fact that existing inventories are chiefly in the hands of the cotton mills ready to be drawn upon by jobbers and consumers.

RAINCOAT FABRICS. Fabric manufacturers are working on goods for the spring trade. These will be ready for the making-up trade early in January. Meantime sales are over for 1929 styles.

SHEETINGS. The activity of sheetings during December was not so pronounced as in the case of grey goods for print cloths. Sheetting prices in consequence remained firm, and inquiries increased accordingly.

TIRE FABRICS. During December the market for tire fabrics continued very quiet with inquiries scattered for small filling-in lots. Since only limited amounts of goods were sold, curtailment of production was effective in many fabric mills. Good business is expected to eventuate very soon, however, when the large Akron tire plants resume three-shift operations with the advent of the new year.

World Rubber Absorption

	Long Tons		12 Months' Running Totals, 1929			
	Calendar	Years	July	August	September	October
Consumption	1927	1928				
United States	373,000	437,000	497,889	493,238	488,073	482,036
United Kingdom	44,800	48,504	61,071	63,739	66,799	*66,621
Net Imports						
Australia	9,516	8,430	14,583	14,600	14,850	*14,500
Belgium	6,491	7,958	8,617	9,000	9,075	*9,000
Canada	26,386	30,447	37,641	38,073	37,169	36,047
France	34,274	36,498	52,404	53,522	53,887	*53,000
Germany	38,892	37,855	47,297	48,635	49,773	48,742
Italy	11,290	12,433	16,413	16,446	16,392	17,183
Japan	20,521	25,621	30,304	32,099	33,773	*33,000
Russia	12,695	15,134	*8,300	*8,300	*9,000	*9,000
Other reported	7,968	10,365	13,260	13,474	13,646	*14,021
Other estimated	8,093	*10,820	*11,000	*11,000	*11,000	*11,000
Grand total	593,866	681,065	798,779	802,126	803,437	794,150
Minus United States	373,000	437,000	497,889	493,238	488,073	482,036
Total foreign	220,866	244,065	300,890	308,888	315,364	312,114

*Provisional figure.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Production—Net Exports

	Long Tons—1929						
	Total	June	July	Aug.	Sept.	Oct.	Nov.
British Malaya:	1928						
Gross exports	409,500	40,398	46,454	50,441	53,484	47,937	46,279
Imports	149,787	14,344	15,071	15,469	12,392	12,516	11,204
Net	259,713	26,054	31,383	34,972	41,092	35,421	35,075
Ceylon	57,267	6,051	5,746	5,564	7,961	8,411	7,195
India and Burma	10,790	1,122	974	685	384	812	.....
Sarawak	10,087	1,061	1,247	993	832	1,047	668
B. N. Borneo	6,698	547	*500	*500	*500	*500	*500
Siam	4,813	422	462	431	406	485	278
Java and Madura	58,848	5,582	6,422	4,664	4,708	4,697	.....
Sumatra E. Coast	82,511	6,693	7,192	7,298	7,517	8,295	.....
Other N. E. Indies	121,671	11,270	13,995	10,782	10,149	10,512	.....
French Indo-China	9,616	608	555	545	755	893	771
Amazon Valley	21,129	1,398	1,457	1,563	1,566	1,606	1,442
Other America	1,490	5	148	24	79	46	.....
Mexican Guayule	3,076	145	200	190	107	200	.....
Africa	6,124	*398	295	285	318	199	.....
Totals	653,833	61,356	70,576	68,496	76,374	73,124	.....

*Estimated.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

United States Production of Tire Fabrics

	1927	1925	1923	1921
Tire fabrics				
United States				
Total pounds	197,353,058	189,345,195	163,686,944	96,247,279
Total square yards	225,931,642	242,126,459	226,555,107	96,656,536
Total value	\$80,974,199	\$105,625,894	\$106,079,633	\$101,652,434
Cotton-growing States				
Pounds	113,203,157	86,233,101	60,134,363	26,122,728
Square yards	121,146,926	112,975,565	86,217,907	25,498,265
Value	\$44,513,833	\$44,722,472	\$36,382,252	\$23,010,337
New England States				
Pounds	70,034,740	73,764,042	81,258,613	58,426,792
Square yards	87,572,222	90,936,559	97,742,894	60,159,584
Value	\$30,959,916	\$43,425,210	\$54,390,297	\$62,525,786
Cord fabrics for tires				
United States				
Pounds	160,612,114	140,492,454	60,269,377	.....
Square yards	179,740,778	176,964,466	100,727,166	.....
Value	\$66,974,970	\$80,478,625	\$39,631,780	.....
Cotton-growing States				
Pounds	88,758,924	56,750,641	9,198,337	.....
Square yards	92,067,547	73,680,626	16,486,328	.....
Value	\$35,483,345	\$30,502,960	\$5,617,847	.....
New England States				
Pounds	61,238,526	59,114,802	43,848,099	.....
Square yards	74,739,784	70,903,101	55,722,609	.....
Value	\$27,257,310	\$35,082,552	\$29,903,457	.....
Tire duck*				
United States				
Pounds	30,164,943	32,081,733	63,858,718	.....
Square yards	35,474,346	40,761,508	68,258,927	.....
Value	\$11,343,197	\$16,628,610	\$42,324,027	.....
Cotton-growing States				
Pounds	20,418,388	22,296,209	15,080,994	.....
Square yards	22,909,757	28,899,184	18,078,353	.....
Value	\$7,548,751	\$10,860,246	\$8,865,816	.....
Tire fabrics other than cord and duck†				
United States				
Pounds	6,576,001	16,771,008	39,558,849	.....
Square yards	10,716,518	24,400,485	57,569,014	.....
Value	\$2,656,032	\$8,518,659	\$24,123,826	.....

*Statistics for New England cannot be shown without disclosing the output of individual establishments.

†Statistics for cotton-growing states and for New England States cannot be shown without disclosing the output of individual establishments.

"Cotton Manufacturers." Census of Manufacture, Department of Commerce, Washington, D. C.

Jatex

Jatex is the name given to a new grade of liquid latex concentrated at 60 per cent raw rubber content. It is concentrated on rubber estates by a special process and does not require the incorporation of protective chemicals. In fact it is 100 per cent latex with ¼ per cent ammonia to prevent coagulation in transit. By achieving 60 per cent concentration, the price has been reduced to an economic level in relation to the ruling price for smoked sheets.

United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	September, 1929		Nine Months Ended September, 1929	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—Free				
Crude rubber	77,215,890	\$15,214,485	981,622,713	*\$188,547,011
Liquid latex	767,905	166,135		
Jelutong or Pontianak	2,044,843	279,225	14,414,370	1,937,069
Balata	86,011	30,327	1,414,732	491,653
Gutta percha			777,504	140,539
Guayule	240,800	51,156	1,905,000	376,083
Stak, scrap and reclaimed	2,096,913	38,053	16,578,510	323,468
Totals	82,452,362	\$15,779,381	1,016,712,829	\$191,815,823
Chicle	447,253	\$216,795	8,908,752	\$4,419,850
MANUFACTURED—Dutiable				
Belting	17,606	\$9,390	43,704	\$25,890
Tires	1,617	17,700	3,287	46,122
Other rubber manufactures		179,386		1,726,585
Totals	19,223	\$206,476	46,991	\$1,798,597

EXPORTS OF FOREIGN MERCHANDISE

RUBBER AND MANUFACTURES				
Crude rubber	4,504,786	\$861,068	63,162,380	\$13,370,590
Balata	11,493	5,027	223,864	102,131
Gutta percha, rubber, and scrap			75,613	6,598
Rubber manufactures		70,026		518,213
Totals	4,516,279	\$936,121	63,461,857	\$13,997,532

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED				
Reclaimed	1,471,165	\$100,027	21,930,385	\$1,535,919
Scrap and old	4,645,609	185,640	40,263,629	1,891,521
Rubberized automobile cloth, sq. yd.	115,964	58,515	1,649,347	847,543
Other rubberized piece goods and hospital sheeting, sq. yd.	113,758	53,562	1,372,844	613,824
Footwear				
Boots	169,989	354,645	991,950	2,154,891
Shoes	866,572	1,074,405	2,307,139	2,331,940
Canvas shoes with rubber soles	711,849	484,892	6,066,410	4,034,089
Soles	10,465	32,331	129,035	318,106
Heels	120,665	86,018	1,144,543	820,942
Water bottles and fountain syringes	51,070	37,032	310,217	209,425
Gloves	11,595	32,600	92,332	238,277
Other druggists' sundries	39,397	39,397	307,054	307,054
Balloons	83,111	93,623	584,098	615,025
Toys and balls		18,301		153,063
Bathing caps	7,918	16,927	166,907	360,797
Bands	32,292	16,758	363,162	194,418
Erasers	52,096	32,030	440,769	283,198
Hard rubber goods				
Electrical goods	58,560	16,243	1,661,527	215,553
Other goods		31,848		344,940
Tires				
Truck and bus casings, 6 inches and over, number	20,935	492,611	207,081	5,786,801
Other automobile casings, number	140,181	1,523,268	1,959,124	20,407,062
Tubes, auto	134,621	236,719	1,473,248	2,663,444
Other casings and tubes, number	5,202	14,106	148,246	387,102
Solid tires for automobiles and motor trucks, number	3,459	107,736	37,584	1,065,404
Other solid tires	55,142	12,990	1,295,085	236,727
Tire accessories		164,891		1,335,522
Rubber and friction tape	137,899	39,021	1,305,694	380,573
Belting	487,351	262,904	4,310,646	2,320,803
Hose	755,200	244,297	6,989,318	2,334,237
Packing	174,936	85,901	1,994,084	906,766
Thread	128,103	123,476	1,272,651	1,295,767
Other rubber manufactures		256,137		2,532,815
Totals		\$6,325,851		\$59,123,550

* Liquid latex included.

Crude Rubber Imports by Customs Districts

	*October, 1929		Ten Months Ended *October, 1929	
	Pounds	Value	Pounds	Value
Vermont			2,000	\$400
Massachusetts	3,820,485	\$697,445	34,069,394	6,421,876
New York	74,760,789	14,277,703	901,919,414	173,549,768
Philadelphia	918,774	160,231	7,184,103	1,367,507
Pittsburgh			2,240	583
Maryland	197,660	39,271	17,662,659	3,252,031
Los Angeles	3,073,329	562,069	60,206,353	11,669,636
San Francisco	111,148	22,023	1,386,938	287,393
Oregon	33,651	6,850	156,858	29,214
Washington			33,415	6,825
Michigan			144,164	29,914
Ohio	3,130,648	554,231	41,397,485	7,535,508
Colorado	90,934	19,375	3,577,960	731,860
Chicago			17,148	3,430
Totals	86,137,418	\$16,339,198	1,067,760,131	\$204,885,945

*Including latex, dry rubber content.

United Kingdom Statistics

IMPORTS

	October, 1929		Ten Months Ended October, 1929	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude Rubber				
Straits Settlements	24,355,800	£1,020,083	155,000,900	£6,781,096
Federated Malay States	9,283,400	392,857	61,660,400	2,734,675
British India	596,600	25,521	9,563,400	427,961
Ceylon and Dependencies	4,027,200	164,926	33,648,700	1,507,720
Other Dutch possessions in Indian Seas	3,153,400	136,873	21,462,600	971,686
Dutch East Indies (except other Dutch possessions in Indian Seas)	3,585,700	155,510	27,511,600	1,228,786
Other countries in East Indies and Pacific not elsewhere specified	206,900	8,786	2,163,200	96,455
Brazil	662,700	27,211	6,365,200	284,000
South and Central America (except Brazil)			123,400	5,426
West Africa				
French West Africa	17,300	673	130,700	4,276
Gold Coast	34,000	1,346	319,700	14,525
Other parts of West Africa	97,800	4,107	1,694,900	70,973
East Africa, including Madagascar	114,900	4,726	768,600	33,537
Other countries	242,800	10,363	1,653,600	73,413
Totals	46,578,500	£1,952,982	322,066,900	£14,234,529
Gutta percha and balata	281,600	26,600	3,260,200	260,646
Waste and reclaimed rubber	522,100	6,728	9,372,400	113,794
Rubber substitutes	13,600	348	81,900	2,066
Totals	47,195,800	£1,986,118	334,781,400	£14,611,035

MANUFACTURED			
*Tires and tubes			
Pneumatic			
Outer covers	£27,884		£394,838
Inner tubes	4,168		72,621
Solid tires	4,999		77,283
Boots and shoes, doz. pairs	40,717	133,962	934,818
Other rubber manufactures	195,208		1,712,649
Totals	£366,221		£3,669,529

EXPORTS

UNMANUFACTURED				
Waste and reclaimed rubber	3,074,000	£23,432	29,137,700	£220,405
Rubber substitutes	72,900	1,572	764,600	15,865
Totals	3,146,900	£25,004	29,902,300	£236,270
MANUFACTURED				
*Tires and tubes				
Pneumatic				
Outer covers	£356,722			£2,902,849
Inner tubes	52,764			452,844
Solid tires	12,954			131,756
Boots and shoes, doz. pairs	32,570	59,427	289,551	461,502
Other rubber manufactures	240,456			2,411,102
Totals	£722,323			£6,360,053

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED				
Crude Rubber				
To—				
Russia	998,700	£43,411	7,241,600	£318,922
Sweden, Norway, and Denmark				
Germany	175,800	11,330	1,799,700	90,908
Czechoslovakia	2,615,400	91,474	28,102,500	1,215,836
Belgium	1,194,700	54,185	8,269,100	375,661
France	2,576,000	120,221	33,987,900	1,548,682
Spain	15,600	932	847,100	39,871
Italy	701,200	30,659	7,431,600	349,044
Other European countries	366,800	21,152	5,443,800	264,032
United States	1,215,900	48,945	9,322,900	385,164
Canada			4,100	195
Other countries	430,500	20,614	2,113,600	108,444
Totals	10,290,600	£442,923	104,563,900	£4,696,759
Gutta percha and balata	22,000	2,249	717,600	55,079
Waste and reclaimed rubber	8,500	203	157,600	2,634
Rubber substitutes			4,500	104
Totals	10,321,100	£445,335	105,443,600	£4,754,576

MANUFACTURED			
*Tires and tubes			
Pneumatic			
Outer covers	£5,854		£54,285
Inner tubes	1,874		11,797
Solid tires			1,059
Boots and shoes, doz. pairs	1,207	3,884	13,548
Other rubber manufactures	8,559		80,789
Totals	£20,171		£177,196

*After April 12, 1927, tires and tubes imported with complete vehicles, or chassis, or fitted to wheels imported separately, are included under complete vehicles or parts.

†Motor cars, motorcycles, parts, and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts and accessories were exempt from duty until Apr. 30, 1926, inclusive, and rubber tires and tubes until Apr. 11, 1927, inclusive.

‡Tires and tubes included prior to Apr. 12, 1927.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

	CASES
Nov. 15. By "Blydendyk," Far East.	1,131
General Rubber Co., Inc.	
Nov. 15. By "Kendal Castle," Far East.	3,212
Robert Badenhop Corp.	
Nov. 16. By "Royal Prince," Far East.	1,248
H. A. Astlett & Co., Inc.	
Nov. 18. By "City of Salisbury," Far East.	257
B. W. Henderson & Co., Inc.	
Nov. 18. By "Hagen," Far East.	30
The Meyer & Brown Corp.	
Nov. 18. By "Luceric," London.	1,718
H. A. Astlett & Co., Inc.	
Chas. T. Wilson Co., Inc.	660
Nov. 18. By "Matra," Far East.	320
H. A. Astlett & Co., Inc.	
General Rubber Co., Inc.	377
Littlejohn & Co., Inc.	170
The Meyer & Brown Corp.	611
H. Muehlstein & Co., Inc.	306
Rogers Brown & Crocker Bros., Inc.	1,360
Chas. T. Wilson Co., Inc.	40*
Nov. 18. By "Silvermarle," Far East.	70
B. W. Henderson & Co., Inc.	
Nov. 19. By "Adrastus," Far East.	156
B. W. Henderson & Co., Inc.	
Nov. 19. By "Pyrrhus," Far East.	67
H. A. Astlett & Co., Inc.	
Robert Badenhop Corp.	3,443
Bierrie & Co., Inc.	848
General Rubber Co., Inc.	242
Haldane & Co., Inc.	1,699
Hood Rubber Co., Inc.	712
Lavino American & Asiatic Co., Inc.	176
Littlejohn & Co., Inc.	80
The Meyer & Brown Corp.	2,523
H. Muehlstein & Co., Inc.	603
Poel & Kelly, Inc.	2,600
Raw Products Co., Inc.	2,657
Chas. T. Wilson Co., Inc.	1,584
Nov. 19. By "Silvermarle," Far East.	
H. A. Astlett & Co., Inc.	2,989
Robert Badenhop Corp.	318
Bierrie & Co., Inc.	829
General Rubber Co., Inc.	2,983
Haldane & Co., Inc.	953
B. W. Henderson & Co., Inc.	380
Lavino American & Asiatic Co., Inc.	220
Littlejohn & Co., Inc.	8,123
The Meyer & Brown Corp.	665
H. Muehlstein & Co., Inc.	*180
Poel & Kelly, Inc.	1,650
Poel & Kelly, Inc.	555
Raw Products Co., Inc.	*11C
Chas. T. Wilson Co., Inc.	100
Nov. 20. By "City of Manila," Far East.	1,831
H. A. Astlett & Co., Inc.	
General Rubber Co., Inc.	112
B. W. Henderson & Co., Inc.	874
Rogers Brown & Crocker Bros., Inc.	200
Chas. T. Wilson Co., Inc.	1,050
Nov. 21. By "City of Khios," Far East.	280
H. A. Astlett & Co., Inc.	
Littlejohn & Co., Inc.	70
The Meyer & Brown Corp.	282
Nov. 22. By "Port Gisborne," Far East.	420
General Rubber Co., Inc.	
Chas. T. Wilson Co., Inc.	25
Nov. 24. By "Wichita," Far East.	30
General Rubber Co., Inc.	
H. Muehlstein & Co., Inc.	392
Chas. T. Wilson Co., Inc.	328
Nov. 25. By "Golden Hind," Far East.	480
Littlejohn & Co., Inc.	
H. Muehlstein & Co., Inc.	*500
Nov. 25. By "Thurland Castle," Far East.	*500
H. A. Astlett & Co., Inc.	
Robert Badenhop Corp.	1,702
Bierrie & Co., Inc.	1,086
General Rubber Co., Inc.	300
Haldane & Co., Inc.	2,358
B. W. Henderson & Co., Inc.	750
Lavino American & Asiatic Co., Inc.	250
Littlejohn & Co., Inc.	100
The Meyer & Brown Corp.	4,955
H. Muehlstein & Co., Inc.	825
Poel & Kelly, Inc.	455
Raw Products Co., Inc.	1,010
Rogers Brown & Crocker Bros., Inc.	80
Chas. T. Wilson Co., Inc.	2,570
	437

*Arrived at Boston.
†Arrived at Los Angeles.
‡Estimated.

	CASES
Nov. 26. By "American Trader," London.	
Chas. T. Wilson Co., Inc.	298
Nov. 26. By "Alaunia," Far East.	
General Rubber Co., Inc.	206
Nov. 26. By "Independence Hall," Far East.	
The Meyer & Brown Corp.	101
Nov. 26. By "Milwaukee," Far East.	
General Rubber Co., Inc.	70
Nov. 26. By "Scythia," London.	
Chas. T. Wilson Co., Inc.	5
Nov. 27. By "Mississippi," Europe.	
Littlejohn & Co., Inc.	*55
Nov. 27. By "Pres. Adams," Far East.	
H. A. Astlett & Co., Inc.	610
Robert Badenhop Corp.	400
Bierrie & Co., Inc.	392
General Rubber Co., Inc.	1,522
Haldane & Co., Inc.	500
Hood Rubber Co., Inc.	50
Lavino American & Asiatic Co., Inc.	200
Littlejohn & Co., Inc.	3,089
The Meyer & Brown Corp.	150
H. Muehlstein & Co., Inc.	*560
Poel & Kelly, Inc.	195
Rogers Brown & Crocker Bros., Inc.	645
Chas. T. Wilson Co., Inc.	1,368
Nov. 29. By "Djemher," Far East.	1,111
H. A. Astlett & Co., Inc.	
Bierrie & Co., Inc.	1,244
General Rubber Co., Inc.	711
Littlejohn & Co., Inc.	3,468
The Meyer & Brown Corp.	1,270
The Meyer & Brown Corp.	499
H. Muehlstein & Co., Inc.	*748
Poel & Kelly, Inc.	358
Raw Products Co., Inc.	110
Rogers Brown & Crocker Bros., Inc.	53
Rogers Brown & Crocker Bros., Inc.	*284
Chas. T. Wilson Co., Inc.	509
Nov. 29. By "Eurylochus," Far East.	
H. A. Astlett & Co., Inc.	750
Robert Badenhop Corp.	79
Bierrie & Co., Inc.	7
General Rubber Co., Inc.	3,472
Adolph Hirsch & Co., Inc.	135
Littlejohn & Co., Inc.	407
The Meyer & Brown Corp.	183
The Meyer & Brown Corp.	*134
H. Muehlstein & Co., Inc.	71
Poel & Kelly, Inc.	34
Rogers Brown & Crocker Bros., Inc.	1,458
Chas. T. Wilson Co., Inc.	323
DEC. 1. By "Pres. Pierce," Far East.	
Littlejohn & Co., Inc.	*242
H. Muehlstein & Co., Inc.	*150
Poel & Kelly, Inc.	110
DEC. 3. By "American Farmer," London.	
Chas. T. Wilson Co., Inc.	71
DEC. 3. By "Minnetonka," London.	
General Rubber Co., Inc.	30
Chas. T. Wilson Co., Inc.	281
DEC. 3. By "Tuscania," Far East.	
H. A. Astlett & Co., Inc.	121
General Rubber Co., Inc.	250
DEC. 4. By "Bengalis," Far East.	
Bierrie & Co., Inc.	*386
General Rubber Co., Inc.	*350
H. Muehlstein & Co., Inc.	*1,680
Poel & Kelly, Inc.	*430
DEC. 4. By "Cingalese Prince," Far East.	
H. A. Astlett & Co., Inc.	1,180
Robert Badenhop Corp.	1,370
Bierrie & Co., Inc.	530
General Rubber Co., Inc.	2,010
Haldane & Co., Inc.	1,050
Hood Rubber Co., Inc.	*142
B. W. Henderson & Co., Inc.	50
Lavino American & Asiatic Co., Inc.	80
Littlejohn & Co., Inc.	5,189
The Meyer & Brown Corp.	1,669
Poel & Kelly, Inc.	910
Rogers Brown & Crocker Bros., Inc.	1,805
Chas. T. Wilson Co., Inc.	1,484
DEC. 4. By "Pres. Hayes," Far East.	
B. W. Henderson & Co., Inc.	100
DEC. 4. By "Thesus," Far East.	
B. W. Henderson & Co., Inc.	145
DEC. 5. By "Silveroak," Far East.	
H. A. Astlett & Co., Inc.	*450
Bierrie & Co., Inc.	*72
General Rubber Co., Inc.	*550
Haldane & Co., Inc.	*400
Littlejohn & Co., Inc.	*741
The Meyer & Brown Corp.	*1,500
H. Muehlstein & Co., Inc.	*530
Poel & Kelly, Inc.	*15C

	CASES
DEC. 6. By "Beemsterdyk," Far East.	
H. A. Astlett & Co., Inc.	366
Bierrie & Co., Inc.	229
General Rubber Co., Inc.	1,734
Littlejohn & Co., Inc.	720
H. Muehlstein & Co., Inc.	552
Rogers Brown & Crocker Bros., Inc.	2,718
Chas. T. Wilson Co., Inc.	545
DEC. 6. By "Steel Scientist," Far East.	
H. A. Astlett & Co., Inc.	670
Robert Badenhop Corp.	628
General Rubber Co., Inc.	1,785
Haldane & Co., Inc.	750
Littlejohn & Co., Inc.	5,703
The Meyer & Brown Corp.	181
H. Muehlstein & Co., Inc.	450
Poel & Kelly, Inc.	1,090
Rogers Brown & Crocker Bros., Inc.	642
Chas. T. Wilson Co., Inc.	1,850
DEC. 9. By "Titania," Far East.	
General Rubber Co., Inc.	901
DEC. 10. By "Blitar," Far East.	
B. W. Henderson & Co., Inc.	250
DEC. 10. By "City of Hankow," Far East.	
H. A. Astlett & Co., Inc.	260
Bierrie & Co., Inc.	306
Littlejohn & Co., Inc.	2,996
Rogers Brown & Crocker Bros., Inc.	812
Chas. T. Wilson Co., Inc.	50
DEC. 10. By "Deebank," Far East.	
H. A. Astlett & Co., Inc.	3,510
Robert Badenhop Corp.	1,238
Bierrie & Co., Inc.	370
General Rubber Co., Inc.	1,415
Littlejohn & Co., Inc.	4,590
The Meyer & Brown Corp.	1,271
The Meyer & Brown Corp.	526
H. Muehlstein & Co., Inc.	520
Poel & Kelly, Inc.	1,002
Raw Products Co., Inc.	100
Rogers Brown & Crocker Bros., Inc.	1,170
Rogers Brown & Crocker Bros., Inc.	*140
Chas. T. Wilson Co., Inc.	165
DEC. 10. By "Steel Exporter," Far East.	
B. W. Henderson & Co., Inc.	150
DEC. 11. By "City of Norwich," Far East.	
H. A. Astlett & Co., Inc.	1,237
Robert Badenhop Corp.	1,638
Bierrie & Co., Inc.	21
General Rubber Co., Inc.	1,420
Haldane & Co., Inc.	1,800
Littlejohn & Co., Inc.	7,400
The Meyer & Brown Corp.	3,070
H. Muehlstein & Co., Inc.	600
Poel & Kelly, Inc.	1,385
Rogers Brown & Crocker Bros., Inc.	2,281
Rogers Brown & Crocker Bros., Inc.	*500
DEC. 12. By "Halerie," Far East.	
H. A. Astlett & Co., Inc.	70
Robert Badenhop Corp.	140
General Rubber Co., Inc.	280
Littlejohn & Co., Inc.	412
The Meyer & Brown Corp.	800
H. Muehlstein & Co., Inc.	400
DEC. 13. By "La Bourdanais," Far East.	
The Meyer & Brown Corp.	101
DEC. 13. By "Magdapor," Far East.	
H. A. Astlett & Co., Inc.	2,271
Bierrie & Co., Inc.	492
General Rubber Co., Inc.	*610
Hood Rubber Co., Inc.	84
Littlejohn & Co., Inc.	4,140
The Meyer & Brown Corp.	252
H. Muehlstein & Co., Inc.	910
Chas. T. Wilson Co., Inc.	142
DEC. 13. By "Pres. Harrison," Far East.	
H. A. Astlett & Co., Inc.	605
Bierrie & Co., Inc.	224
General Rubber Co., Inc.	1,112
Haldane & Co., Inc.	750
Hood Rubber Co., Inc.	*42
Littlejohn & Co., Inc.	3,762
The Meyer & Brown Corp.	374
H. Muehlstein & Co., Inc.	365
Poel & Kelly, Inc.	110
Rogers Brown & Crocker Bros., Inc.	2,593
Chas. T. Wilson Co., Inc.	983
DEC. 14. By "Dardanus," Far East.	
H. A. Astlett & Co., Inc.	1,396
Bierrie & Co., Inc.	675
Haldane & Co., Inc.	600
Littlejohn & Co., Inc.	7,906
The Meyer & Brown Corp.	1,029
The Meyer & Brown Corp.	*550
H. Muehlstein & Co., Inc.	510
Rogers Brown & Crocker Bros., Inc.	4,160
DEC. 14. By "Golden Dragon," Far East.	
Poel & Kelly, Inc.	*700
DEC. 14. By "Imperial Prince," Far East.	
H. A. Astlett & Co., Inc.	3,120
Bierrie & Co., Inc.	330
Haldane & Co., Inc.	1,750
Lavino American & Asiatic Co., Inc.	80
Littlejohn & Co., Inc.	15,283
The Meyer & Brown Corp.	2,574
H. Muehlstein & Co., Inc.	3,550
Poel & Kelly, Inc.	555

	CASES
Raw Products Co.	430
Rogers Brown & Crocker Bros., Inc.	5,822
Dec. 14. By "Madoera," Far East.	
H. A. Astlett & Co.	1,165
Bierrie & Co., Inc.	136
Haldane & Co., Inc.	250
Hood Rubber Co.	*50
Littlejohn & Co., Inc.	2,564
The Meyer & Brown Corp.	127
The Meyer & Brown Corp.	*136
H. Muehlstein & Co., Inc.	915
Poel & Kelly, Inc.	310
Raw Products Co.	254
Rogers Brown & Crocker Bros., Inc.	2,216
Dec. 15. By "Wray Castle," Far East.	
Poel & Kelly, Inc.	977
*Arrived at Boston.	

Balata

Nov. 19. By "Cottica," Paramaribo.	
Middleton & Co., Ltd.	5
Dec. 5. By "Dominic," Peru.	
Paul Bertuch & Co., Inc.	99
Dec. 11. By "Commewyne," Paramaribo.	
Middleton & Co., Ltd.	1

Rubber Latex

Nov. 19. By "Silvermaple," Far East.	
General Rubber Co.	gals. 144,918
Dec. 6. By "Steel Scientist," Far East.	
General Rubber Co.	gals. 65,541

Africans

Nov. 29. By "Wytheville," Antwerp.	
Hood Rubber Co.	*704

Guayule

Nov. 26. By "El Oceano," Mexico.	
Continental Rubber Co. of N. Y.	560
Nov. 29. By "Occidente," Mexico.	
Continental Rubber Co. of N. Y.	560
Dec. 14. "Camaguey," Mexico.	
Continental Rubber Co. of N. Y.	560
Dec. 14. "El Alba," Mexico.	
Continental Rubber Co. of N. Y.	560

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
Nov. 13. By "Swinburne," South America.					
H. A. Astlett & Co.	358				
Nov. 29. By "Higbo," South America.					
The Meyer & Brown Corp.	123				
Dec. 3. By "Southern Cross," South America.					
Paul Bertuch & Co., Inc.	40				
Dec. 7. By "Justin," South America.					
Paul Bertuch & Co., Inc.	225				

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
General Rubber Co.	493				
Littlejohn & Co., Inc.	177				
The Meyer & Brown Corp.	185		85	99	
Dec. 13. By "Stephen," South America.					
Paul Bertuch & Co., Inc.	248				
General Rubber Co.	58				
Littlejohn & Co., Inc.	294				
The Meyer & Brown Corp.	113			99	

United States Crude and Waste Rubber Imports for 1929 by Months

	Plantations	Paras	Africans	Centrals	Manicobas and Matto	Total	Balata	Miscellaneous	Waste
	1929	1928	1929	1928	1929	1929	1928	1929	1928
January	51,202	1,055	30	5	13	52,305	46,243	67	799
February	63,851	530	60	97		64,538	29,445	80	1,220
March	51,661	2,112	15	36		53,824	40,894	85	825
April	53,256	844	8	4		54,171	37,240	87	1,606
May	47,940	1,078	54	49	59	49,180	32,883	88	1,013
June	43,313	1,032	44	1	100	44,490	35,792	91	1,323
July	43,130	931		57	134	44,252	33,382	75	1,044
August	37,572	572	5	9	134	38,292	29,805	102	1,031
September	31,849	473	60	58	75	32,515	46,662	48	755
October	42,697	512	33	18	465	43,725	42,515	91	994
November	39,932	524	14	1	150	40,621	34,720	62	613
Total eleven months, 1929	506,403	9,663	323	335	1,176	517,913	.....	876	11,223
Total eleven months, 1928	383,705	10,746	1,217	548	3,364	.....	399,581	1,072	9,241

Compiled from Rubber Manufacturers Association statistics.

British Malaya

RUBBER EXPORTS

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S. W. 1, England, states that the amount of rubber exported from British Malaya in November, 1929, totaled 46,279 tons as compared with 47,937 tons in October last and 68,072 tons in the corresponding period of 1928. The amount of rubber imported was 11,204 tons of which 8,361 tons were declared as wet rubber. The following are comparative statistics:

	1928		1929	
	Gross Exports Tons	Foreign Imports Tons	Gross Exports Tons	Foreign Imports Tons
January	27,731	16,618	52,546*	13,415
February	28,813	12,911	47,926	12,103
March	27,813	10,508	49,448	14,553
April	20,029	9,335	49,816	11,414
May	26,403	10,350	43,960	15,593
June	22,930	16,168	40,398	14,344
July	30,405	13,383	46,454	15,071
August	35,593	15,114	50,441	15,469
September	29,700	11,239	53,484	12,392
October	24,441	12,603	47,937†	12,516
November	68,072	10,436	46,279	11,204
Totals	341,930	138,665	528,689	148,074

* The period January to September, 1929, inclusive, excludes latex 1,789 tons.

† October, 1929, figures exclusive of latex 313 tons. November, 1929, figures exclusive of latex 369 tons.

The above figures represent the totals compiled from declarations received up to the last day of the month for export from and import to all ports of British Malaya and not necessarily the actual quantity shipped or landed during that month.

DISTRIBUTION

The following is a comparative return of distribution of shipments during the months of October and November, 1929:

	October, 1929	November, 1929
	Tons	Tons
United Kingdom	10,063	9,361
United States	29,230	28,545
Continent of Europe	4,972	5,007
British Possessions	685	751
Japan	2,942	2,544
Other foreign countries	45	71
Totals	47,937	46,279

Reported Rubber Stocks

Long Tons—1929

	June	July	Aug.	Sept.	Oct.	Nov.
Producing Centers						
Singapore	25,641	28,950	26,496	28,248	28,582	30,913
Penang	6,220	6,523	6,628	6,043	6,365	
Para	4,475	3,658	3,678	3,462	2,955	3,237
Totals	36,336	39,131	36,802	37,753	37,902	34,150
Manufacturing Centers						
London	31,025	30,080	35,642	42,188	48,092	52,538
Liverpool	4,550	4,561	7,507	10,026	14,272	17,752
Amsterdam	1,560	1,569	1,867	2,203	2,221	
United States	92,062	95,536	90,769	84,362	88,483	92,219
Plantations afloat*	80,020	83,412	87,219	94,252	86,895	
Grand totals	245,553	254,389	259,806	270,784	277,865	.....
Totals	209,217	215,258	223,004	233,031	239,963	.....

*W. H. Rickinson & Son, The World's Rubber Position.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Plantation Rubber Exports from Malaya*

January 1 to September 30, 1929

	From Singapore Tons	From Penang Tons	From Malacca Tons
To United Kingdom	12,273.00	11,597.00	8,523.00
British Possessions	3,995.00	996.00	385.00
Continent of Europe	20,229.00	4,063.00	5,499.00
United States	135,500.00	37,902.00	15,989.00
Japan	16,298.00	150.00	1,101.00
Other countries	686.00	90.00	10.00
Totals	188,981.00	54,798.00	31,507.00

*Excluding all foreign transshipment

Low and High New York Spot Prices

	1929*	December 1928	1927
PLANTATIONS			
First latex crepe...	\$0.16¼ @ \$0.17¼	\$0.18¼ @ \$0.19	\$0.40 @ \$0.41¼
Smoked sheet, ribbed	.15¼ @ .16¼	.17¼ @ .18¼	.40 @ .41¼
PARAS			
Upriver fine.....	.15¼ @ .16¼	.19¼ @ .19¼	.30¼ @ .35
Upriver coarse.....	.08¼ @ .08¼	.13 @ .14	.24¼ @ .27¼
Upper caucho ball...	.08¼ @ .08¼	.12 @ .13	.25¼ @ .27¼

*Figured to December 26, 1929.

Tire Production Statistics

	High Pressure Pneumatic Casings			Cord		
	All Types					
	In- ventory	Pro- duction	Total Shipments	In- ventory	Pro- duction	Total Shipments
1928	58,457,863	55,721,937		19,302,218	19,351,380	
1929						
January ..	10,284,158	5,041,530	4,969,647	3,651,041	1,563,554	1,461,104
February ..	11,620,960	5,183,093	3,961,751	4,073,644	1,373,691	974,185
March	12,263,816	5,639,426	5,031,101	4,330,747	1,397,657	1,157,188
April	12,696,808	5,912,854	5,470,779	4,292,167	1,305,224	1,335,121
May	13,386,440	6,109,026	5,388,291	4,285,674	1,371,987	1,356,529
June	13,467,567	5,477,771	5,440,693	3,956,799	1,249,596	1,594,201
July	11,872,330	4,856,241	5,891,020	3,325,494	1,162,182	1,690,264
August	10,669,370	4,354,153	5,883,561	2,773,039	1,055,483	1,681,389
September ..	9,656,392	3,568,200	4,498,772	2,351,815	949,535	1,315,845
October	9,633,404	3,689,184	3,719,757	2,275,990	952,347	1,052,969

	Balloon Casings			Solid and Cushion Tires		
	In- ventory	Pro- duction	Total Shipments	In- ventory	Pro- duction	Total Shipments
1928	38,878,218	35,931,982		508,223	512,602	
1929						
January ..	6,583,958	3,470,596	3,499,121	149,240	31,583	33,051
February ..	7,472,592	3,796,660	2,976,698	145,811	29,747	31,463
March	7,858,642	4,229,586	3,863,650	141,902	35,441	40,365
April	8,346,737	4,601,986	4,123,769	137,613	38,419	43,130
May	9,047,376	4,732,416	4,022,910	133,654	39,611	42,414
June	9,471,532	4,223,335	3,829,506	131,633	39,741	40,355
July	8,515,634	3,689,616	4,192,894	127,653	38,470	40,781
August	7,869,710	3,293,595	4,192,328	117,313	32,114	42,653
September ..	7,266,230	2,655,594	3,173,529	110,596	27,702	36,125
October	7,332,047	2,788,113	2,658,907	110,874	34,576	35,794

	High Pressure Inner Tubes			Balloon Inner Tubes		
	In- ventory	Pro- duction	Total Shipments	In- ventory	Pro- duction	Total Shipments
1928	23,255,891	23,749,966		36,878,990	34,095,223	
1929						
January ..	4,734,477	1,540,272	1,800,676	6,805,018	3,347,660	3,630,579
February ..	5,159,171	1,398,156	1,046,042	7,572,752	3,675,116	2,908,406
March	5,356,289	1,475,822	1,276,490	7,938,587	4,120,493	3,773,585
April	5,220,167	1,347,128	1,447,504	8,369,244	4,375,920	3,921,768
May	5,017,011	1,155,013	1,480,293	9,167,038	4,586,606	3,795,350
June	4,384,077	1,177,147	1,698,896	9,654,688	4,049,173	3,510,947
July	3,540,819	1,034,118	1,355,297	8,692,058	3,249,014	3,945,727
August	2,927,371	1,534,547	2,202,751	7,675,503	2,846,491	3,926,368
September ..	2,785,533	1,349,926	1,675,954	7,258,870	2,598,062	3,008,065
October	3,103,336	1,610,942	1,274,129	7,121,095	2,368,892	2,475,005

	Cotton and Rubber Consumption		Casings, Tubes, Solid and Cushion Tires	
	Cotton Fabric Pounds	Crude Rubber Pounds		
1928	222,243,398	600,423,401		
1929				
January ..	19,779,481	54,160,529		
February ..	20,326,530	57,558,636		
March	21,238,416	61,335,423		
April	23,619,687	65,673,453		
May	23,302,120	66,028,029		
June	20,358,937	56,861,320		
July	18,125,761	52,249,004		
August	15,802,783	45,458,603		
September ..	13,469,050	39,981,294		
October	13,706,668	41,774,943		

Rubber Manufacturers Association figures representing 75 per cent of the industry.

Netherlands East Indies Exports

	Long Tons		1929			
	Total Jan.-Aug.		May	June	July	August
Java and Madura	38,527	46,656	6,264	5,582	6,422	4,664
Sumatra East Coast ..	51,807	56,987	6,961	6,693	7,192	7,298
Other N. E. I.*						
Atjeh	2,556	2,879	302	275	439	374
Riouw	6,449	7,243	1,016	869	1,102	716
Diambi	23,658	20,805	3,072	2,561	3,096	2,490
Palembang	12,562	15,883	2,581	1,973	2,497	1,463
Lampoons	1,947	2,279	317	285	335	286
Benkoelen	30	53	5	4	5	5
Sumatra West Coast ..	753	974	135	110	129	148
Tapanoeli	3,656	4,390	634	522	529	485
Banka	489	769	217	84	114	29
Billiton	63	98	21	14	14	15
W. Coast Borneo	13,267	18,490	2,771	2,337	2,640	2,228
S. and E. Borneo	17,573	20,328	2,600	2,359	3,421	2,578
Menado	138	121	12	18	17	13
Celebes	30	53	8	4	10	1
Amboino	20	17	1	1	2	3
Totals	83,191	94,362	13,692	11,416	11,969	8,833
Grand totals	173,525	198,005	26,917	23,691	25,583	20,795

*Including wet native rubber from which a deduction of approximately 33 1/4 per cent must be made in order to reduce to a dry basis.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Rubber Questionnaire

Third Quarter 1929*

	Long Tons			
	Inventory at End of Quarter	Produc- tion	Ship- ments	Con- sumption
RECLAIMED RUBBER				
Reclaimers solely (8)	6,133	22,479	21,431	82
Manufacturers who also reclaim (23) ..	8,480	31,498	10,878	24,358
Other manufacturers (72)	4,193	.....	.....	17,143
Totals	18,806	53,977	32,309	41,583

	Long Tons		
	Inventory	Consump- tion	Due on Contract
SCRAP RUBBER			
Reclaimers solely (8)	38,000	28,753	7,795
Manufacturers who also reclaim (19) ..	40,472	46,370	18,647
Other manufacturers (10)	470	.....	.....
Totals	78,942	75,123	26,442

TONS OF RUBBER CONSUMED IN RUBBER PRODUCTS AND TOTAL SALES VALUE OF SHIPMENTS

PRODUCTS	Crude Rubber		Total Sales	
	Long Tons	Value of Shipments of Rubber Products		
Tires and Tire Sundries:				
Automobile and motor truck pneumatic casings	69,220	\$169,903,000		
Automobile and motor truck pneumatic tubes...	13,813	23,604,000		
Motorcycle tires (casings and tubes)	61	405,000		
Bicycle tires (single tubes, casings, and tubes) ..	349	877,000		
Airplane casings and tubes	66	100,000		
Solid and cushion tires	2,175	4,752,000		
All other solid tires	224	721,000		
Tire sundries and repair materials	1,152	4,737,000		
Totals	87,060	\$205,099,000		

PRODUCTS	Crude Rubber		Total Sales	
	Long Tons	Value of Shipments of Rubber Products		
Other Rubber Products:				
Mechanical rubber goods	5,785	\$28,234,000		
Boots and shoes	4,873	31,266,000		
Insulated wire and insulating compounds	976	8,963,000		
Druggists' sundries, medical, and surgical rubber goods	545	2,409,000		
Stationers' rubber goods	316	631,000		
Bathing apparel	103	503,000		
Rubber clothing	471	2,696,000		
Automobile fabrics	342	3,267,000		
Other rubberized fabrics	709	2,751,000		
Hard rubber goods	381	1,889,000		
Heels and soles	1,635	6,298,000		
Rubber flooring	285	1,366,000		
Sporting goods, toys, and novelties	344	2,002,000		
Miscellaneous, not included in any of the above items	821	2,815,000		
Totals	17,586	\$95,090,000		
Grand totals—all products	104,646	\$300,189,000		

INVENTORY OF RUBBER IN THE UNITED STATES AND AFLOAT

	Long Tons			
	On Hand	Plantation	Para	All Other
Manufacturers	49,414	2,147	418	51,979
Importers and dealers	28,734	1,317	479	30,530
Totals on hand	78,148	3,464	897	82,509
AFLOAT				
Manufacturers	15,124	...	...	15,124
Importers and dealers	32,126	163	...	32,289
Totals afloat	47,250	163	...	47,413

*Number of rubber manufacturers that reported data was 157; crude rubber importers and dealers, 51; reclaimers (solely), 8; total daily average number of employees on basis of third week of July, 1929, was 175,578.

It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory and afloat figures 95 per cent; the reclaimed rubber production 93 per cent, reclaimed consumption 73 per cent, and reclaimed inventory 78 per cent of the total of the entire industry.

Compiled from statistics supplied by the Rubber Manufacturers Association, Inc.

London Stocks, October, 1929

	Stocked October 31			
	Landed for Oct. Tons	Delivered for Oct. Tons	1929 Tons	1927 Tons
LONDON				
Plantation	11,631	6,011	47,661	24,112
Other grades .....	.....	.....	*52	79
LIVERPOOL				
Plantation	15,342	11,465	113,903	12,393
Total tons, London and Liverpool	16,973	7,476	61,616	26,584

*Corrected by inspection.

*Official returns from the recognized public warehouses.

